

Our 12th Year

\$1.10

AMATEUR TELEVISION MAGAZINE

MARCH-APRIL, 1979

Vol. 9, No. 2

BUILD: A Digital Scan Converter for \$100

A 100 watt conduction cooled 450 MHZ L Linear

A 2305 MHZ Receive Converter

\$1.50 mod to receive 256 line format on a Robot 400

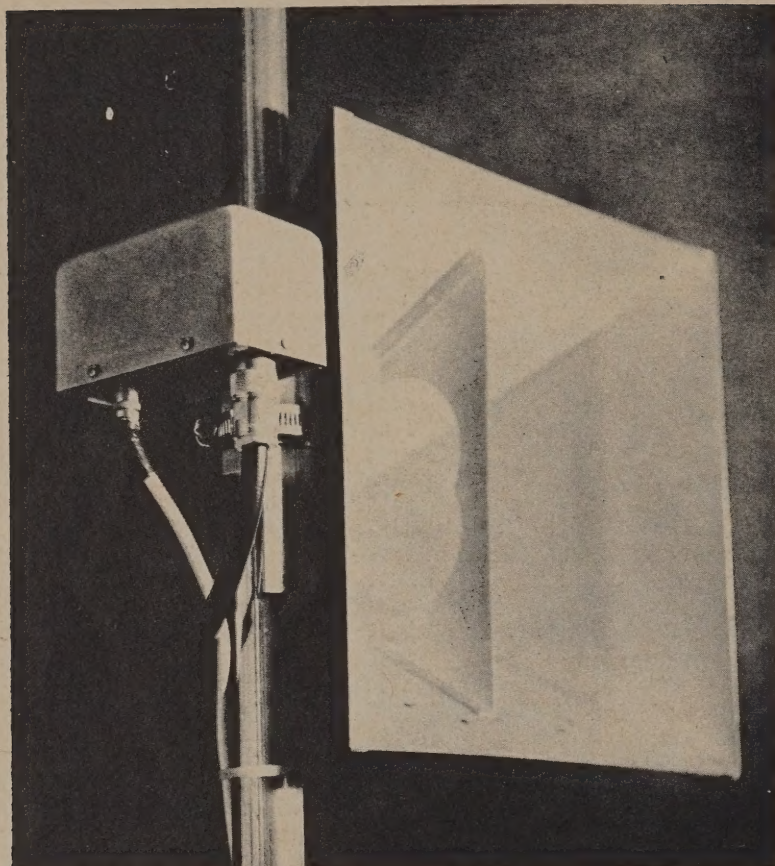
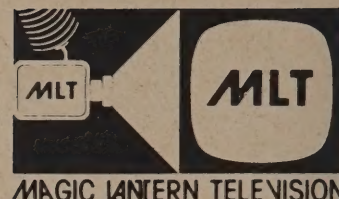
How FCC rules are made

and much more



IT'S NEVER TOO EARLY TO GET STARTED

INTRODUCING-



MODEL ATCR-3 DOWNCONVERTER FOR 2350 MHZ.

**TWO MICROWAVE PRE-AMP STAGES
6 DB NOISE FIGURE
15 DB CONVERSION GAIN**

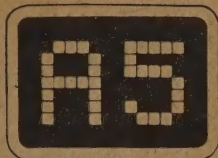
This little gem comes to you completely assembled, tested, and ready to go. Connect it to one of the antennas listed below, run a 75 Ohm coax down your mast to the regulated power supply, another to your TV set, and you're ready to receive 2350 mHz! The temperature stabilized LO may be tuned by a control on the set-top supply for output on TV channel 2, 3, or 4.

ATCR-3 Downconverter and Power Supply:	\$110.00
17-TH Tuned Horn Antenna, 17 dB Gain:	32.00
20-P 2' Solid Parabolic Antenna, 20dB:	135.00
24-P 4' Grid Parabolic Antenna, 24 dB:	200.00
24-JC 2' Type N Antenna Jumper Cable:	13.00
(Add \$35 shipping charge for 4' Antenna)	

Send check or money order to: MAGIC LANTERN
Box 221
Carlisle, MA 01741

Call Doug Milne at 617-369-1834 for further information.

PLEASE NOTE: We had intended to introduce these products in the last issue of A5, but due to a mix-up, what appeared was a bulletin on MDS equipment available only to organizations providing pay-TV service. We wish we could have filled the orders, but as the FCC's PUBLIC NOTICE #11850 of Jan. 24th 1979 reminds us, intercepting MDS transmissions is a violation of Section 605, and we cannot provide equipment for this purpose.



DEVOTED TO HAM TV

Published bi-monthly by Henry B. Ruh KB9FO. United States Postal Service publication number 944960. Mailed as second class matter from Topeka, Ks. 66601 and elsewhere. Principal offices 7391 W HWY 46, Ellettsville, IN 47429. This publication is copywrited and the publisher reserves all rights. Persons desiring to duplicate or reprint material may obtain permission to do so by contacting Amateur Television Magazine, Box 1347, Bloomington, IN 47402. Blanket permission is granted to amateur radio publications to reprint news and editorial items without prior consent. Those so doing are requested to provide source credit.

Amateur Television Magazine

P.O. Box 1347,

All correspondence to:

Bloomington, IN 47402

NEWS AND OTHER GOOD STUFF

Some days are better than others! I appologize to the folks at Magic Lantern. Through a mutual misunderstanding, the ad we ran last month for MDS receivers was supposed to be for a 2300 Mhz receiver system for amateur service, not the 2150 Mhz commercial TV service. Federal regulations prevent them from selling the MDS receivers knowing that you probably are not authorized to receive the special pay TV signals in that band. In stead, they would like to sell you some ready to operate down-converters for 2300Mhz. Still a good deal for those of us who like the clutter free UHF/SHF bands. The correct ad is on the inside cover of this issue.

Dayton looms on the horizon, look for the A5 booth somewhere in the mess. Tom O'Hara W6ORG of PC Electronics and Bob Cooper of CATJ will be there with us for most of the convention displaying the latest goodies.

The University of Cincinnati will have a large truck load of TV equipment in the flea market. They sent me quite a long list, too long to reprint here, but heed the notice that you will find most anything you want in TV equipment out in the flea market. By the way, the fleas will be allowed to set up on Friday this year meaning no more 3 AM line up, pull in, no sleep crap as in years past. A much better arraignment. Also, flea market is \$10 which covers both days (even if you come for only one day), and is payable in ADVANCE.

Mel WIBHD writes to say that the Boston repeater K1VTR/R-ATV is up and operating. They have most of the bugs out and are up to 200 watts. They have operated with color signals and are supplying interested folks with Science Workshop tuners to get their feet wet. They also have a great idea sign for public demos to promo ATV and the repeater.

Glen Baumgartner of Ft. Leavenworth, KS (913-651-6612) has some T-282 transmitters for sale. They are tunable AM transmitters and operate from 180 to 440 Mhz and are easilly converted for ATV use and supply over 200 watts of output, and are capable of a KW easy. Prices is \$100 or less depending on how much of the units you want.

Fred WØNTD and Jim KØPHX in Wichita, KS are on ATV using the PC Electronics transceivers are are trying to work W5DFU, Warren in Tulsa. Both have advantageous QTH's and as soon as weather permits will have good antennas up.

The BATS, (Baltimore) ATV hamfest will be July 29th rain or shine at the Howard county Fairgrounds, rt 32 and I-70, 15 miles W of Baltimore. \$2 fer tickets, \$2 fer tailgaiting, advance tables \$4. Contacts BRATS, Box 5915, Balt, MD 21208.

The Cass County, IN hamfest is May 6 at the Logansport 4-H fairgrounds, Hwy 25. QSY at Rd 100 and follow the QSY signs. \$1.50 advance, \$2. gate, bring ur own tables. Free overnite camping. Talkin on 78-18/52. Info Dave Rothermel K9DVL, RFD 4 Box 146G, Logansport, IN 46947.

The last issue was a little late getting out, but we hope it was worth the wait. Bad weather and illness both at the home QTH and at the printers took its toll. It was my 25th issue, so we went all out to make it the biggest and best ever. The new size is the same as the other major mags, and makes it easier for everyone. It will also allow us to have larger diagrams, a frequent complaint, and will save us a little in paper costs. 16 of these pages is the same amount of space as 32 of the old pages. The last issue was 36 pages, or 72 of the old size pages. Our previous record was 56 pages in the March 1975 issue. The typesetting also helped since it allows about 30% more text per page over typing. All in all, it was a giant issue, and most likely, the biggest we will ever have. The circulation of the anniversary issue was 1400 copies! We started with a circulatin of about 400 in 1975, not a bad improvement in that area either.

Bill W4CVS of Adamsville, AL is on with the Apron equipment, and is also building an ATV RPT using the Apron TX. He is looking for ATVers in the Atlanta/Chattanooga area. Bill is also giving a public demo on march 15th to help stir up interest.

Bill also has mods for converting commercial TV antennas for ATV.

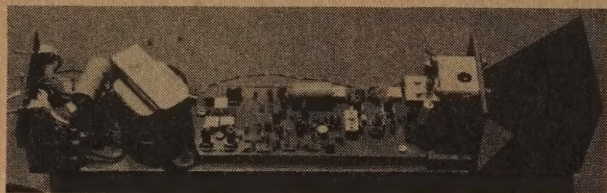
Charlie W4API suggests that folks who are interested in Satellite TV reception get a copy of app note #3 which is 8 pgs from Paul Shuch, 14908 SHady Ln., San Jose, CA 95124. Its a clear text explanation of MDS, DOMSAT video, microwave transmission modes and their requirements. Send a large SASE.

The big news this month has to be Takao's digital scan converter project for \$701 Its for converting fast scan signals to slow scan, and you can use it with your P-7 monitor for a cheap 2-way SSTV system.

Another great page in a great little magazine. A5 is your magazine!

This Month's Kit

Low-cost do-it-yourself microwave. The famous CATJ Lab developed 'Mini-Wave' GunnPlexer video plus audio transmission system as detailed in the June and July (1978) issues of CATJ, and as also featured on the front cover of **Popular Electronics** (October 1978) with a second part in the current (November) issue of PE.



Everything is here except the pair of Microwave Associates GunnPlexers (with the kit we tell you where to get rapid delivery of these units). The housing, the circuit boards, the parts. PLUS—you also receive instructions for assembly and alignment, and we give you sources for 2-4 foot parabolic antennas should you require more range than the 17 dB gain horn antennas offer. **An exceptional value for experimental microwave work**—puts you on the air with both a 15 mW transmitter (transmits baseband video—such as 1 volt peak to peak—and audio) and a high quality receiver (delivers 1 volt to peak video—in full color—and 600 ohm audio). If you have been wanting to work with your own low-cost microwave equipment, this CATJ KIT makes it possible! And if you want video only (for surveillance, etc. purposes) a **video only kit** is also available. PLUS—you have the backup of the CATJ Lab should you run into assembly or operation problems. This Kit is an exceptional buy for the CATJ system operator.*

PRICE—KIT MW-10 (video and audio), receiver and transmitter—\$187.

KIT MW-10V (video only), receiver and transmitter—\$147.

*—Equipment operating frequency determined by the GunnPlexer you order; typically 10 GHz region in FCC amateur or experimental assigned bands.

CATJ's Kit Korner

The CATJ '**KIT KORNER**' brings to the cable television industry a **selection** of 'do-it-yourself' **construction kits** offering you the opportunity to expand your own knowledge of CATV hardware and systems; and to add to your own system's operational versatility the advantage of state-of-the-art equipment. Kits offered through 'Kit Korner' are **backed up by the CATJ Lab** where you can obtain trouble shooting and de-bugging assistance (if required), at very nominal costs.

Each kit offered through 'Kit Korner' has been developed in the CATJ Lab, or by a CATJ reader who has submitted the project as a construction article in CATJ. **The CATJ Lab refines projects** by supplying all parts, circuit boards and alignment instructions as required. . .to insure that your kit building experience is both troublefree and educational. Readers with a construction project of their own who would like to see their construction project 'published' and offered to the worldwide CATV industry through 'Kit Korner' should contact CATJ editor in chief Bob Cooper for details of this program.

Future 'Kit Korner' projects will include TVRO receiving modules, CATV test equipment, test and work bench 'time-savers' and do-it-yourself low-cost plant and headend equipment for very small (rural, low density) CATV systems. The CATJ '**KIT KORNER**' is your **one-stop source** for CATV learning aids. . .you learn by doing and you have the long term benefits of on-going use of the equipment you build yourself through '**KIT KORNER**' projects!

GREAT FOR ATV LINKS, REPEATER LINKS, FM VIDEO EXPERIMENTATION, DOZENS OF OTHER APPLICATIONS

**KIT
KORNER
ORDER
FORM**

- _____ **\$187 ENCLOSED**—please send to me (postpaid) one complete Mini-Wave transmitter and 1 complete Mini-Wave receiver kit (less GunnPlexers), model MD-10 (video and audio).
- _____ **\$147 ENCLOSED**—please send to me (postpaid) one **video-only** Mini-Wave transmitter and one **video-only** Mini-Wave receiver kit (less GunnPlexers), model MW-10V.

Ship to:

NAME _____

Company (affiliation) _____

Address _____

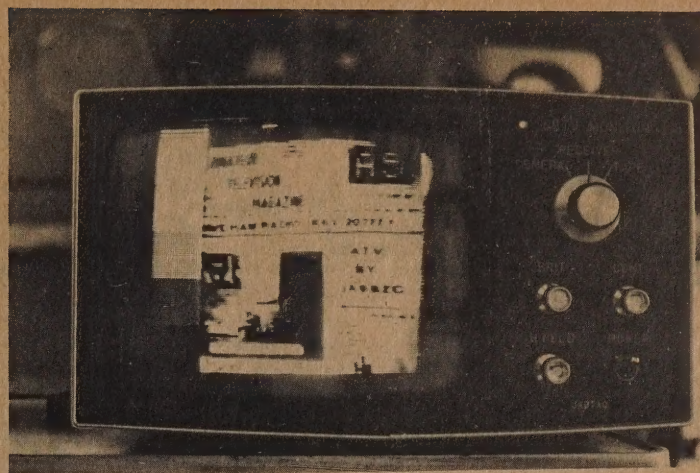
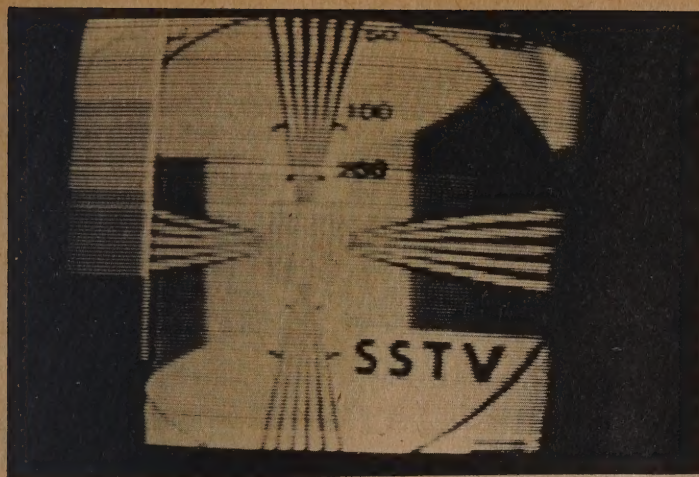
Town/city _____ State _____ Zip _____

Enclose payment with
order to:

**CATJKITS
BOX 1347
(U.S.A.)**

BLOOMINGTON, IN 47402

CATJ's KIT KORNER



BUILD A DIGITAL SCAN CONVERTER FOR LESS THAN \$100

by

Takao Yabana JA0BZC

This device is easily constructed at home from inexpensive parts and uses the new BBD device to provide for fast to slow scan conversion of video signals.

SSTV has been allowed in Japan for 5 years. Recently, the introduction of digital scan converters has made it more enjoyable. SSTV is now the wave of the future in ham radio.

A while ago, I received from my friend JA0DJQ, a BBD device. It occurred to me that it would be possible to build a digital scan converter based upon this unique device, the BBD, or Bucket Brigade Device.

Most projects to build a slow scan converter involving a digital scan conversion techniques all used an expensive a/d and d/a conversion scheme which uses many parts and is costly for the home builder because of the memory size involved.

Many manufacturers are now making the BBD in inexpensive packages since they are used in audio delay lines, echo and telephone delay units used in recording and broadcasting. Since they are very cheap, it would seem that I could make an SSTV converter based upon these devices and do so very inexpensively.

What is the BBD? It is a Bucket Brigade Device. It is a digital electronic delay unit which can work at various speeds depending on the clocking of the input data and is used mostly in audio delay circuits.

The BBD is a monolithic planar device with a long train of capacitors and transistors. A 180° 2 phase clock signal is used to clock the information through the device. The amount of

delay depends on the number of cap/transistor stages used in the device. Also, the clock signal rate can be used at various speeds to effect the delay time.

THE CIRCUITS

Old time SSTV'ers will recognize that the circuit is much like the older sample and hold systems. This is correct. The difference is in that in this circuit we use the BBD. This system allows for fast to slow conversion only, you still will need a slow scan monitor for receive, but these older P-7 monitors are cheap and often easily built from the various articles published over the years, or simply use this with your P-7 monitor and save the cost of buying a new scan converter/camera.

This particular unit does not have the stunt box additions of commercial units, such as pos/neg transmission, or part frame transmission. These would be easily added to this unit, if the builder so desires, but this basic design is good enough to get you started. Feel free to add whatever goodies you like, since most of the "options" are simple added switches to trigger earlier V sync or invert the output signal using a simple additional video stage to the circuit.

The sync circuits derive an input from the standard TV signal (EIA/NTSC) and divide the sync down to provide clock and slow scan sync signals. If you are in a 50hz area, you will need to use an EIA oscillator or change the device by circuits. This unit is designed for use with 60hz mains and sync. Incoming sync goes to TR-1. TR2 and 5 divide the 15.750 and 60 Hz to provide H and V drive. The 60 Hz is divided by 4 to provide the 15Hz SSTV sync signal and the BBD clock switching signal. The 15Hz signal

makes the 1/8 Hz SSTV vertical sync signal through IC 12 and 13. I used 7492 and 7490 ICs so the device count is 120. If you substitute a binary counter, you will have 128 lines, no big difference. If you use 120 lines, you will have a 5 step gray scale, if you use the binary system for 128 lines, you will have four step gray scale.

The 1/8Hz signal is used to make the 1/8 sawtooth signal is TR-8.

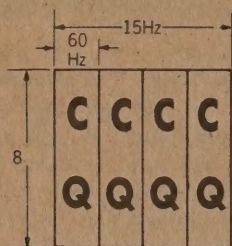
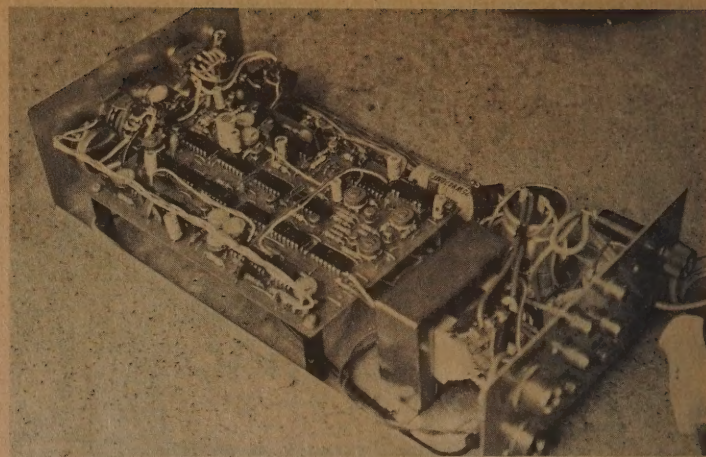
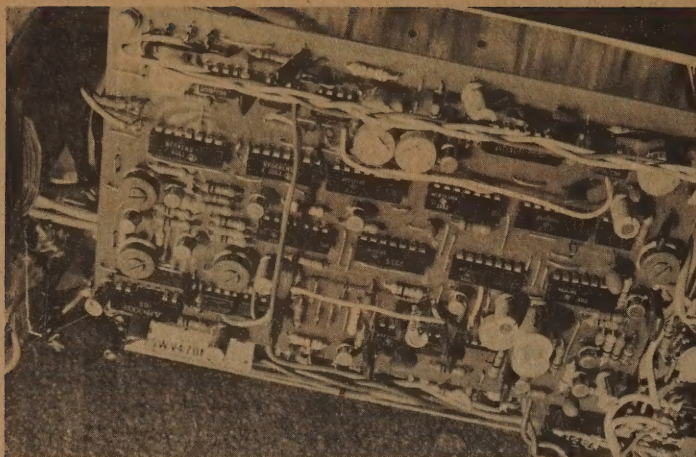
The 15.75 Khz and 1/8Hz signals are sent to a comparator (IC 1). The Opamp is a cheap LM 301. A SN 74121 one shot is used to make the $3\mu\text{S}$ sampling pulse to sample the video signal.

The sampling circuit used is simple a diode. Very cheap, and an old system but diode switching still works good. The hold is accomplished using a uA 741. There are better sample and hold systems and you should feel free to use them if you wish.

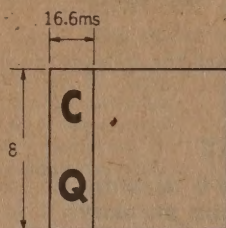
The BBD device requires a bias. I thought about how I could use the BBD in a DC circuit. The answer is, at present you can't! All of the manufacturers data sheets indicate that you cannot use the BBD in a DC circuit. After pondering the basic operation of the BBD I was able to come up with this circuit. Because the BBD has many FETs in a sample and hold system, the input can have a tiny low pass section of a 10K ohm resistor and a .01 uFd capacitor. In this way it will reject the writing error to convert the information into the BBD.

The older sample type slow scan cameras used a system similar to this one, but the scan rate is 15 Hz, and it isn't easy to change the scanning rates of the older cameras to provide this. Instead, a regular camera is used.

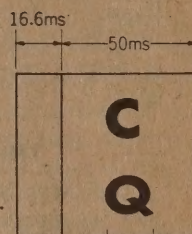
The BBD memory is 16.6 ms. And the BBD is extended 3 times the width



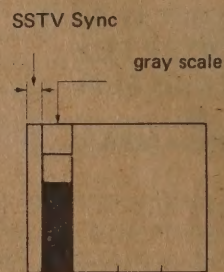
(a)



BBD writes picture
(b)



Output
(c)



(d)

DAYTON

HAMVENTION '79

April 27, 28, 29, 1979

HARA ARENA AND EXHIBITION CENTER DAYTON, OHIO

- Technical Forums
- ARRL and FCC Forums
- GIANT Flea Market
- New Products and Exhibits
- Grand Banquet
- FCC Exams
- Special Group Meetings
- Fabulous Prizes
- CW Proficiency Tests
- Amateur of Year Award
- Special Achievement Awards
- Expanded Parking

Information Brochure Available in March.

FOR MOTEL RATES AND RESERVATIONS WRITE BOX 44, DAYTON, OH 45401

OR CALL (513) 228-0016 9 A.M.-5 P.M. EST WEEKDAYS

FOR OTHER INFORMATION CALL (513) 293-0459 — 5-10 P.M. EST

Bring Your Family and Enjoy A Great Weekend in Dayton

ATV Magazine's First Book...

ATV IN A NUTSHELL

EVERYTHING YOU NEED TO KNOW TO BUILD AND OPERATE YOUR OWN HAM TV STATION

FEATURES INCLUDE:

Simple Language Theory explains the mystery of video

Practical Tips on how to operate ATV for fun and DX

ATV Operators Directory

Commercial ATV Equipment Manufacturers Directory

Build It Projects for a complete station by top ATV'ers

Station Accessory Projects for better and easier operation

ATV Repeater Directory

Tips of Selecting Build It or Buy It ATV equipment

All projects are current solid state designs, no obsolete tube items

Special operating aids include a custom ATV Log for easier ATV operation camera alignment charts, video signal charts, signal reporting chart, video terminology explanations. First hand operating and equipment tips from ATV operators. Not just reprints of old articles, this book has all the useful information a new or experienced ATV operator needs to successfully improve or start his/her own Ham TV Station. Over 120 schematics, figures, diagrams and photos adorn the 8 x 11 pages for ease in building and understanding the topics covered, and much more.

Available from: Amateur Television Magazine, Box 1347, Bloomington, IN 47402. \$5 plus postage per copy. Dealer and distributor discounts available for bulk purchases. Club discount available also.

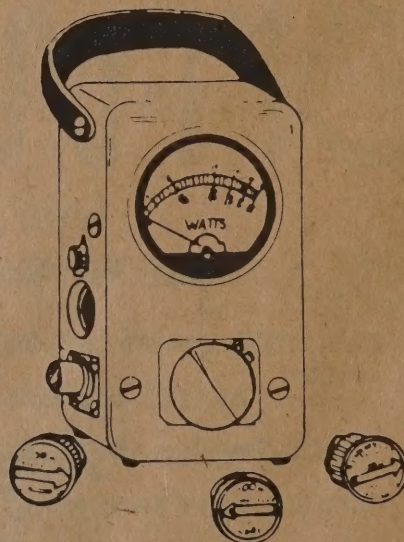
Postage: Book rate 50¢ 1st Class \$1.25 per copy.

Bulk: Ups COD or pre-paid, shipping weight .5 pound per copy.

1-4 no discount, 4-25 \$3.00, 26-99 \$2.50

100-up \$2.30 plus shipping

AUTHORIZED
BIRD
DISTRIBUTOR



CALL US
TOLL FREE
800-521-2333

WEBSTER
associates

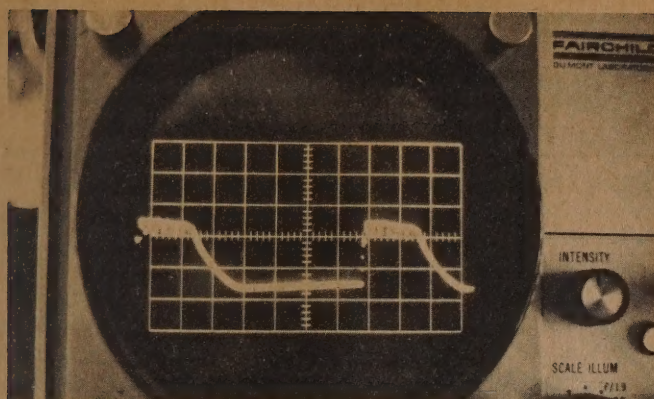
115 Bellarmine
Rochester, Michigan 48063
In Michigan 313-375-0420

! IN STOCK !

ORDER NOW!

BUILD A DIGITAL SCAN CONVERTER (CONTINUED)

BBD. BIT.	PANASONIC	WRITE CLOCK	READ CLOCK	OSC.F
1,024	MN3007	30kHz	10kHz	60kHz
2,048	MN3008	60kHz	20kHz	120kHz
4,096	MN3005	120kHz	40kHz	240kHz



of a scan line. The remaining time is not needed, so a gray scale is inserted to occupy the unused BBD time.

The gray scale is only 11ms. The portion is only 1/5.5 of a picture width. The picture and the BBD clock is used as a kind of shift register. But if the clock stops, the memory is lost. The clock rate can change in the BBD, and the maximum memory time of the BBD is about 50 ms. So we need 1000 bits to keep it running. The 1024 bit device is available, as are others and I chose to use a 2048 bit device. You could use 2, 512 bit devices (MN3001) however, it has a very large DC shift, and is difficult to use with this circuit.

From the clock chart you can see that the BBD needs two clock signals 180° apart. A good square wave is just what we need. The output balance is not critical in video use, so this eases our circuit requirements.

A cheap NE555 makes the BBD clock. It is cheap, simple and works well. The output is divided by 2 and 6 by IC 11, a 7492. The squarewave must be a 50% duty cycle signal, so the 1/2 and 1/6 clocks are switched by a 7400 (IC 9) gate. The RT224 is a level shift transistor to interface the BBD level to the TTL level. Any 10¢ transistor can be used here as it is not critical. Most any PNP will work, so scrounge around.

The output of the BBD is controlled by a brightness (level shift) and gain control (contrast). In everyday use, I only need to adjust the brightness control, so in my unit the contrast pot is not on the front panel, but inside on the circuit board.

The raw BBD output signal has a lot of switching transients in it, but they are all easily removed by a low pass filter. An active filter is best.

If a 1024 bit device is used, the high frequency components of the output of the BBD will be at 10 KHz or above, and will drop out with

any good low pass filter (since we need only 2300 Hz audio). If you use the 2096 bit device, one stage of filtering is enough.

The SSTV signal needs a black and white clamp circuit. I used one picked up from an old camera circuit I and JAØCVF built. This circuit is adequate and works well. Gray scale is inserted because of the additional time in the BBD writing exceeds the video width. The SSTV line counter makes 5 steps of gray scale with the 7403 open collector gate.

The gray scale is not critical so the parts I used are all 5% tolerance. The gray scale is used when calibrating the unit for black and white saturation.

The subcarrier modulation uses a PUT. I had lots of them on hand so I used this type but other types of modulation circuits are OK. You could use a PLL as the audio oscillator if you want.

For the uA741, you could use a 4558, but I have many 10¢ uA 741s. Remember, this is supposed to be a cheap system!

Calibration of the unit is simple. If you have a sampling camera it can be used for a reference. If this is your first project then the following procedure is OK. You will need an oscilloscope (good to 1 meg and triggered sweep) and an audio range frequency counter.

Connect a camera to the input terminal. Look at collector of R1 and find the 15,750 KHz and 60 Hz. If the sync signals do not separate change the 33K ohm and 220 K ohm in TR 1 next to IC 8. Pin #1 is 15 KHz 5ms. OK? Next, IC 14 pin #1 is 30 ms at 8 Hz. The SSTV vertical and horizontal are determined by the 74121. These do not require adjustment. Connect the scope to pin #6 of IC 1. Look for a sliding pulse and adjust the 47 K pot in TR 3 and 1 meg pot in TR 8. If the adjustments are correct, you will always be able to see the sliding pulse

except during sync.

Now observe the picture on the monitor and judge or measure the aspect ratio. Connect the blanking pulse to IC 2 for sampling pulse during the BBD writing time only. You should now see the sampled 1/4 video at pin 6 of IC 3 at 15 Hz.

Check the BBD clock by the frequency counter. Or a calibrated oscilloscope. Adjust the 10 k ohm pot in IC 4 for maximum video level.

The tone generator adjustment is made by first shorting the C and E leads of TR -12 and adjusting the 4.7 K ohm pot in TR 11 base for 1200 Hz. output. The brightness pot is used to adjust for 2300 and 1500 Hz is adjusted by the clamp pot. I used K7YZZ's SSTV analyzer so it was very easy for me. Lastly, adjust the 10 k pot in TR9 to set the gray scale white position. Your picture is now sideways! This is a sampling system, so turn your cameras 90°!!!

This scan converter was made for less than \$50. Except for the BBD, all the IC's are cheap TTL from the surplus market. The BBD is a special part. You may not be able to find it locally. It is an MN3008. I can get it and supply anyone who wants one to use to build this unit for \$18.00 plus postage. Just send a postal money order and I will return the part to you air mail. (ed note: send about \$4 for airmail service, and a cup of 'saki' for Takao for his efforts!).

The photos show the completed unit, and its video output as seen on Takao's monitor.

Because of the inexpensive nature of this device, it would seem a natural for some of the more monetarily endowed hams to build a few for DX stations, since they could then use the older/cheaper P-7 monitor and any camera, with this unit for two way SSTV. Cheap enough, most anyone could build on just as a spare unit if your Robot gets swiped! (who would be dumb enough to sell it or give it away??)

KLM Superior-Quality VHF and UHF Antennas

2 Meters...

Two-meter beams deliver maximum gain and clean patterns, with VSWR of less than 1.2:1 across the entire 144-148 MHz range. High grade insulating materials, weather-resistant aluminum boom and elements. 12, 14 and 16-element beams make outstanding moon-bounce building blocks.

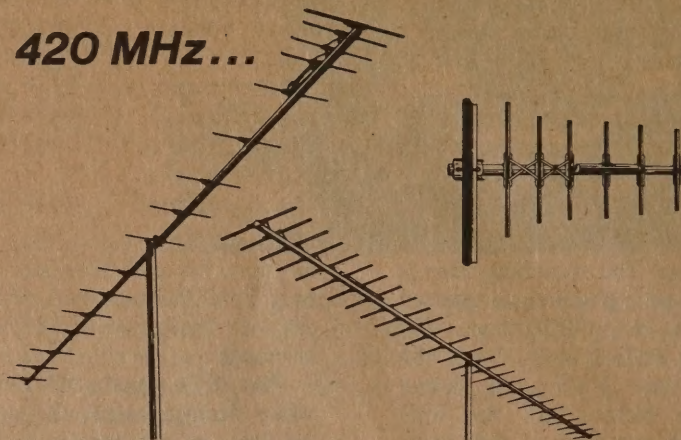
14-Element KLM-144-148-14 \$65⁹⁵

Gain: 14.2 dBd. Beam width at 3 dB pt.: 18 degrees. Feed impedance: 50 ohms balanced (KLM 1:1 Balun, 144-148-50 optional). Boom dia.: 1½". Boom length: 17.33'. Max. mast size: 1½". Center mounting. Wt.: 8 lbs.

16-Element KLM-144-148-16 \$72⁹⁵

Gain: 14.8 dBd. Beam width at 3 dB pt.: 16 degrees. Feed impedance: 50 ohm balanced (KLM 1:1 Balun, 144-148-50 optional). Boom dia.: 1½". Boom length: 20.66'. Max. mast size: 1½". Center mounting. Wt.: 10 lbs.

420 MHz...



A versatile series of KLM beam antennas in a variety of configurations: broadband rear-mount type for horizontal or vertical arrangement, ultra-high-gain DX type, and optimized long boom Yagi for narrow-band use. All have VSWR less than 1.2:1 across the entire band. Maximum mast size: 1½".

6-Element KLM-420-470-6 \$19⁹⁵

Frequency: 420-470 MHz. Gain: 8 dBd min. F/B ratio: 20 dB min. Beam width at 3 dB pt.: 30°. Feed impedance: 50 ohm balanced (Balun 420-470-50 optional). Boom dia.: 1". Boom length: 2'. Mounting: End or center; horizontal or vertical. Weight: 1.2 lbs.

14-Element KLM-420-470-14 \$31⁹⁵

End mountable; vertical or horizontal polarization. Excellent for repeater control. Frequency: 420-470 MHz. Gain: 13.7 dBd. Beam width at 3 dB pt.: 24°. F/B ratio: 20 dB min. Feed impedance: 50 ohm balanced. Boom dia.: 1". Boom length: 4.75'. Wt.: 4 lbs.

KLM Antenna Accessories

BALUNS

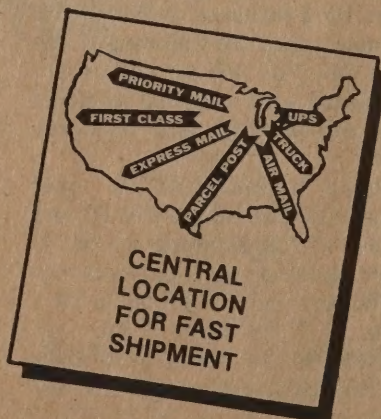
\$24⁹⁵
EA.

(Specify Band)

Sleeve baluns feature Teflon and low loss airline construction. SO-239 connectors with 144 and 220 MHz baluns; "N" fittings with 432 MHz. Many ratios available.

PLEASE ADD \$3.50 PER ANTENNA FOR SHIPPING AND HANDLING (CONT U.S.)...CREDIT CARD ORDERS MAY DISREGARD - WE WILL FIGURE EXACT COST

FAMOUS-NAME
BRANDS
IN STOCK...
FULL SERVICE
FACILITIES
TOO!





Model 43
\$125 + shipping

BIRD

... If you have been having difficulty locating the Wattmeter or element just right for you... You may have been looking in the wrong places. Our large inventory of most common elements lets you get what you want when you need it. Give us a call first for your BIRD needs.



SPECTRONICS, INC.

1009 GARFIELD
OAK PARK, IL. 60304
312-848-6777
TELEX 72:8310

HOURS

STORE HOURS:

Mon-Thurs 9:30-6:00, Fri. 9:30-8:00
Sat. 9:30-3:00, Closed Sun. & Holidays.



SSTV IDEAS

For those of you with a Robot 400 digital scan converter, here are some simple inexpensive ideas.

Although there are very few stations on the air with 256 line capability, you can copy these signals with the same ease as you do the 128 line format. The width control on the Robot varies the horizontal scan frequency. As supplied by the factory, you can use this adjustment to compensate for the different length of scan line for 50 and 60 Hz based scan systems. If you give the knob a full left hand turn, you will also see about 80% of the 256 line system picture. Wallah! Now for simple magic! If you replace the control with a 5K ohm pot, you will have more than ample range to see all of the 256 and 128 line pix, and can fill your screen to the edges with either. As supplied, I found that the 50/60 hz based 128 line pix filled the screen with the knob around the 3 o'clock area. With a 5 K pot, the 128 line pix is still near 3 o'clock, and the 256 line pix is about 9 o'clock. I used a linear taper pot. With a 25 K ohm pot, you can squeeze the pix down into more than 3X, which allows some extra tricks at no additional cost.

When the first 128 line pix comes in, I run it in full screen, I then turn the pot down and compress the remaining incoming pix into the upperleft 1/4 of the screen. The pix will also be duplicated into the upper right 1/4 of the screen. You now have three pix, two full scans, compressed into the top half of the screen, and the bottom half of the first frame. By varying the control from pix to pix, various composit pix can be assembled. Total cost, about \$1.50. You will still be transmitting the pix as a 128 line format. Conversely, you could enlarge the picture by changing the value of the fixed resistor which is in series with the width control.

Since it will be a long time before the 256 line system becomes popular, if ever, this is an inexpensive way to enjoy both and not have to think of spending a kilobuck just to keep up with the James' Jones' or Smith's!

Idea #2. Often, while in SSTV QSO, you would like to immediately retransmit the other stations pix. To do this with a cassette or reel type recorder is often frustrating as you shuttle, overshoot, or guess at where the pix started, or everyone waits while you find the spot. On the surplus equipment market are a number of broadcast type cart machines. These are used by radio-tv stations to play spots, commercials, etc. The carts they use are endless loops with tape lengths (any value you want if you wind them, or order them) in standard values of 40 sec, 70, 90, 110, sec, 2.5 min and up.

The real value is in the ease of operation. When you start to record, a cue tone is recorded on the cue track (seperate from any audio track(s). When the cart has gone fully around, the tone is sensed by the machine and it stops, re-cued, ready to play again. No hunting for the beginning or wasted

time shuttling the tape back and forth! These units can be found for \$25-\$400 depending on vintage (tube or solid state) and condition. The older units have virtually no trade in value, and with the coming of stereo AM broadcasting, many stations are dumping the older mono units and buying newer stereo models. You may be able to beg a freebie if you ask around.

The machines do not have an erase circuit. So you need a stack of bulk erased carts, or erase the cart each time you want to record. This is not as bad as it sounds. Used carts sell for 50¢ to \$1, so a stack of carts will cost you less than a stack of cassettes.

Since it is normal to send 3 frames of each pix, the cart lengths work out fine for rapid recue. Since 3 frames is about 24 seconds, the 40 sec cart is recued in 15 seconds, which is about the time it takes for the other station to tell you what it was and turn the QSO over to you for your comments.

Since the cart will run and re-cue each time, you can reply the same pix over and over if you need, or simple change carts to keep a series. You can then dub what you want to save onto a cassette or reel tape later for long term storage.

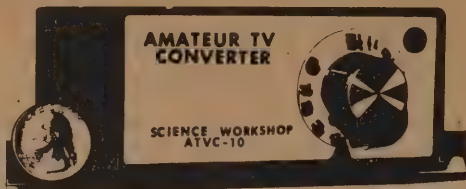
With rare exception, all the carts are directly interchangeable. The longer carts are useful for running your "programs" since you can get up to 12.5 minutes on the "regular" size, and up to 32 minutes on bigger size carts. Thus, a 5.5 min cart for a 5 minute program would be ready again in 30 seconds, super for replaying the Jupiter pix over and over to the hungry folks. It also eases finding a particular recording if you have been putting more than 1 signal on a cassette, because you can add secondary cues, or record more than 1 "cut" on a cart and automatically cue the cart to whatever cut you want to play. This in itself should make your SSTV QSO's faster and easier for everyone. If you have a problem finding a used machine near you, Allied Broadcast Eqpt in Richmond, IN (ask for Jim Jones) usually has some used ones on hand. Its more expensive but you are sure to get one that works.

There are also cart machines which hold more than 1 cart, so you could have one in record ready and several in play mode for "instant replay" TV. This sort of operation opens the way to many other applications, so use your genius.

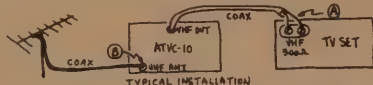
TUNABLE AMATEUR TV CONVERTER

NEW

ATVC-10



By connecting a UHF antenna to the input of the converter, and the output of the converter to the VHF antenna terminals of any TV set, the operator can see what the local hams are doing on a TV.



The circuit consists of a low noise, high gain RF amplifier stage with Varactor tuned input and outputs, an active (transistor) mixer stage with Varactor tuned input, and a Varactor tuned oscillator stage. Uses 3 transistors and 4 Varicap diodes. RF gain is adjustable.

The built-in AC power supply uses a transformer for power line isolation and 4 diodes in a full wave bridge. The supply voltage for the 4 tuning Varactors is regulated. The converter tunes electrically (no moving parts) from 420 to 450 MHz and outputs on CHANNEL #3.

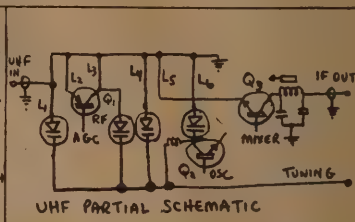
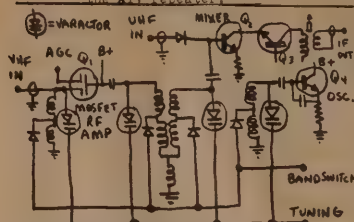
Note: From ARRL Specialized Communications Techniques.

"Tunable converters are preferred over the crystal controlled variety, for several reasons. ATV is normally A. M. with two sidebands, rather than the carrier-and-one-sideband of commercial T.V. For the clearest picture it is helpful to be able to tune off to one side or the other of the ATV carrier, depending on the shape of the receiver I-F Pass-band, and local occupancy of the lower vhf TV channels".

The ATVC-10 comes completely wired & tested & guaranteed for 2 years. It is housed in an attractive 2 tone (walnut & beige) finished aluminum cabinet, only 1 7/8" X 4 1/4" X 4", with Full instructions Only \$59.95.

UHF/VHF VARACTOR TUNERS

The two tuners described below tune electrically (no moving parts) from approximately 50 MHz to 1 GHz (with a few gaps in-between). They are both HI-GAIN, LO-NOISE, STATE-OF-THE-ART tuners. They were manufactured for one of the leading manufacturers of Solid State Color T.V. They differ radically from conventional tuners since they are VOLTAGE tuned, rather than mechanically tuned. They both have double-tuned R.F. amplifier stages (a dual gate MOSFET in the VHF tuner). These tuners, in addition to their improved gain, noise and selectivity, provide increased tuning range (above and below conventional T.V. tuners) through the use of varicap diode tuning. This makes it practical to use the UHF unit to tune the 420-450 MHz ham band with no modifications. Similarly, the VHF unit can be made to tune the 6 meter, 2 meter and 220 MHz ham frequencies. Connecting the UHF unit in place of the conventional one in our TV set here in Bethpage, we were able to pick up the local ATV hams and the ATV repeater.



The frequencies that the tuners were designed to cover in their normal application are:

VHF 54 to 88 MHz and 174 to 216 MHz

UHF 470 to 890 MHz

Varying the Varactor tuning voltages above and below those used for tuning the VHF & UHF TV channels provides the additional coverage into the adjacent ham, public service, etc. frequencies. Isolating the tuning voltage to the oscillator varactor offsets it to produce IF output frequencies other than the 45 MHz Video IF normally used. We have been able to output at frequencies from 20 to 200 MHz!

These tuners have been successfully adapted to provide specialized, hi-quality receivers and converters over a wide range of frequencies - as well as in other diversified applications (such as the spectrum analyzer described on the opposite page). Also, as tuner-subbers, remote control tuning (a la Jerrold), mast-head converters (convert 450 MHz at the antenna and come down with 45 MHz to eliminate UHF transmission line losses), telemetering receivers, etc. They are supplied with diagrams for typical applications and sold with a MONEY BACK GUARANTEE.

Prices: UHF --\$7.95 ea. (2-\$15)
VHF --\$19.95 ea.
Combination (1ea. UHF/VHF) \$24.95

RCA SOLID-STATE VHF POWER AMPLIFIER

Cat.#102
Commercial, mobile 150-170 MHz, brand new, completely enclosed 9"X 2 1/4" X 2" package. Contains driver & stud mtd. power transistors, metering leads, solid state T-R switch & Lo-pass output filter. 100 MW in, 6-8 Watts out @ 13.8 Volts. Schematic & 2 Meter conversion instructions included. Only \$9.95.

Cat. #103 **E.F. JOHNSON 8 CHANNEL UHF SCANNER CHASSIS**
Tunes 420-470 MHz. American made professional scanner. 10.7 MHz & 455 KHz Ceramic ladder filters. Ideal for dedicated ATV sound receivers (on-channel or sub-carrier). Monitor up & down links, 440 repeaters etc.) Manual/Scan modes. Squelch & APC. Built in power supply requires 12 volts A.C. or D.C. Sold for over \$150.00. Complete chassis w/ front panel, schematic & parts layout, less speaker, channel crystals, & case. Checked out, only \$19.95. Repairable, only \$9.95.

Cat. #104 **PRECISION DIGITAL MEDICAL ELECTRONIC THERMOMETER.**
Made for hospital use -cost approx.\$300.00 Range from 90.2°F to 106.9°F. Press & release button. Decimal point LED lights. After 35 seconds, warning beep signals temperature will be displayed for 10 seconds. Flashing decimal point indicates low battery, time to recharge. Shuts down automatically before lower voltage can affect accuracy. Contains 11 I.C.'s, 25 transistors, 20 diodes, audible alarm & 4 seven segment PIN-LITE displays. All parts have standard (2N,etc.) numbers. Can be used for it's original purpose or as the basis of many electronic devices. Substitute a carbon monoxide variable resistance sensor for the thermistor probe (data supplied) and tune your car! Operates on 6V. D.C. Complete P.C. board (as is) \$6.95, (tested) \$9.95. In alum. case, add \$1.95. Thermistor probes (with coil cord & plugs) \$2.75 ea. Charger base \$5.95. COMPLETE NEW-FACTORY SEALED PACKAGE Containing 1 thermometer in case, 2 probes (oral & rectal) charger base, shoulder strap, 4-AA NI-CADS & instruction manual. \$24.95.

Cat.#105 **AS-IS 12" SOLID STATE T.V. P.C. BOARD**
Contains Video & Sound I.F., Sound det. & output, sync, AGC, video, Hor. & Vert. osc. & Amp., H.V. Xfmr, controls, CRT socket etc. No schematic. Approx. 6"X 8". Great for ATVC's. Only \$7.95

Cat.#106 **DIGITAL TV GAME BOARD**
Brand new, tested. Contains 95 standard TTL IC's (no house numbers), Xtal (16.128 MHz) clock generates standard composite video & sync, character generator & counter circuits produce numbers. Sound effects circuits generate ping-pong sounds. No schematic. 5V. 2A. on board regulated supply. Just add filament transformer & paddle controls. Hook-up circuit & instructions supplied. Measures 9" X 17". Only \$7.95.

Cat.#107 **AUDIO OR R.F. OPERATED RELAY BOARD**
Monitor your favorite repeater (or CB channel) while listening to radio (or stereo). Speakers (1 or 2) are switched from radio to your rig when this electronic marvel senses audio from your rig. Holds it as long as there is audio & then returns it to normal operation. Also mutes the radio while transmitting, automatically eliminating the need for switching one unit on and the other off (senses R.F.). Operates on 12V. D.C. Instructions supplied. Brand new, only \$4.95

RCA REGULATED DUAL SUPPLY

Cat.#108
Two independent 150 ma. supplies, each adjustable from approx. 6 to 9 volts. Can be combined to supply 12 to 18 volts. Very low ripple. 9 transistors & 7 diodes. Transistor switched "power-on" light. Beautifully built, approx. 11"X5"X2" alum. package. 3 fuses. Instructions supplied, brand new-only \$14.95

Cat.#109 **NEW ATV BOOK "ATV IN A NUTSHELL"**
Everything you need to know to build & operate your own HAM TV station. Over 60 schematics, figures, diagrams & photos. Only \$5.00

Cat.#110 **NARROW BAND P.W.M. CERAMIC FILTER SET.**
Consists of 1- 10.7 MHz filter and 1- 455 KHz Ladder Filter, as used in the E.F. Johnson UHF/VHF Scanner. Supplied with scanner schematic showing how to use them. Also ideal for "advanced spectrum analyzer" application, etc. Set, only \$9.95

Cat.#111 **MAGNOVOX VIDEO I.P. STRIP**
State of the art- MOSFET I.P. module. Ideal for building "off-the-air" T.V. monitoring & conversion receivers, etc. when used with our varactor tuners. With schematic, only \$19.95

Cat.#112 **ATV/UHF CONVERTER MODULE**
New, UHF Varactor tuner, as modified for use in our ATVC-10 Tunable ATV Converter. Input 420-450 MHz. Output TV channel #3 (61.25 MHz). Modified, tested & aligned-with instructions-\$19.95

Cat.#113 **ATV CONVERTER REGULATED POWER SUPPLY KIT**
New. P.C. board and all parts to build regulated supply to power the ATV/UHF Converter Module. Includes trim pots for R.F. Varactor tracking & AGC, AC transformer, 3 terminal regulator, diodes, resistors, capacitors, etc. with instructions: \$12.95

Cat.#114 **COMBINATION CONVERTER MODULE & REG. PWR. SUPPLY KIT**
Consists of Catalog #112 and #113. Only \$29.95

NOTE: New I.P. strip for Spectrum Analyzer Kit in the works- old one sold out. Watch #5 for availability.

HOW TO ORDER:

Send check or money order - add \$1 to orders under \$15, or 5% over \$15 for shipping. N.Y. residents add tax. COD OK, need street address for UPS. Satisfaction guaranteed. Our products may be returned within 10 days for a full refund (less shipping).

SCIENCE WORKSHOP
Box 393, Bethpage, N.Y., 11714



CQ SSTV DE K4TWJ DAVE INGRAM

Contributing Editor
Amateur Television Magazine

Eastwood Village No. 1201 South
Rt. 11 Box 499
Birmingham, AL 35210

DAYTON '79

This year's Dayton Convention should prove to be another technical blowout in which a culmination of efforts by many innovators will be revealed. Judging by our many significant advancements during recent months, I dare say this year's gathering will be the biggest yet. As this information is being written, the scheduled events are shaping as follows. The Friday night SSTV/-ATV gathering is scheduled to be held in the Hara Arena. This should eliminate the previous hassles with small rooms, etc. This meeting, which runs from 5:30 p.m. to 8:30 p.m., will host several speakers and provide an informal gathering for all interested video enthusiasts. The Saturday program is scheduled for a two hour forum. Dr. Don Miller, W9NTP, will emcee the program, plus discuss several interesting aspects of SSTV and Medium Scan TV. Robert Cooper, W5KHT, will discuss FMTV at 10 GHz. Considering the present excitement over home satellite tv terminals, Cooper's presentation should be very interesting. Dr. Robert Suding, WØLMD, will discuss Medium Scan TV and its computer operation. Obviously, "Caesar" has come a long way in the last year. We may all be able to realize just how much progress has been made after Robert's presentation. Steiber, WB9LVI, will discuss high resolution SSTV. Steiber had some good ideas on this aspect last year, thus his "Phase 2" techniques should be very promising. Finally, A5 Editor, Henry Ruh, WB9WWM, is scheduled to discuss the topic of sure-fire ATV. Needless to say, this presentation by our "Captain Video" should be a winner. Due to an excessive number of recent problems at my end, I'm presently unsure if I will be able to attend Dayton '79. If I attend, I may discuss Medium Scan TV repeaters. Basically, this concept employs a 10 meter to 70 cm and 2 meter repeater system with a video recorder, scan converter and control unit at the repeater site (which is located in a users home). Incoming 10 meter MSTV is converted to FSTV and retransmitted on 70 cm while accompanying audio is directed to the 2 meter link. Transmission of prerecorded MSTV programs is accomplished by calling up these programs via touchtone codes on the 2 meter link. Monitoring of the transmitted 10 meter MSTV pictures is accomplished by the 70 cm Fast Scan link. Although this concept calls for users to frequently visit the repeater QTH, such visits merely further group participation. Why a Medium Scan repeater? The cost factor is shared among all users and a totally portable station (2 meter HT and a portable television) are two prime reasons. Similar audio-only remote base setups are presently being used on 10 FM, and their capabilities are fantastic.

A growing number of amateurs are expressing dissatisfaction over the yearly Dayton Convention. The usual thoughts center around excessive crowds, space problems and perpetual inconveniences. We all know the Dayton bash gets larger and more packed each year. Maybe its time to start thinking of a smaller, more hospitable convention for the major SSTV gathering? Maybe SSTV and ATV should be split into two different conventions? Surely I will be "shot down" for mentioning such ideas!

DX SSTV DRIVE RESULTS

The massive search for SSTV gear to equip VR6TC and VK9RH which we described in the last issue of A5 was an overwhelming success. As you will recall, Brooks, W1JKF, was overseeing the VK9RH collection while I handled similar activities for VR6TC. Soon after that issue of A5 was released,

things began happening at a rapid pace. A number of outstanding events occurred which has resulted in VR6TC receiving a Robot 400 system complete with camera and monitor, while VK9RH will receive a Robot Model 70 and 80 SSTV setup. At the present time, specific equipment donors ask that I keep their identity anonymous. However, I can assure you that all parties are highly respected radio amateurs. The Robot 400 system was deeded to the people of Pitcairn Island, and it is hoped this setup will provide a visual link which the country can use for numerous applications. This gear was loaded onto the Yankee Trader, which left Florida in mid February enroute to Pitcairn. The Trader should arrive in Pitcairn during April. The North California DX foundation is assisting with transportation of SSTV gear to VK9RH, since there was absolutely no available room aboard the Yankee Trader.

W6VIO SPECTACULAR

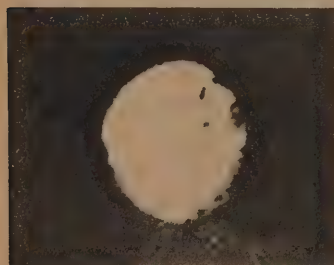
As planned, the gang at JPL hit the airwaves during early March with some fantastic views of Jupiter and its moons. The continuous views and commentaries afforded by the JPL group held numerous Slow Scanners absolutely spellbound. Generally, all amateurs appeared quite considerate and provided a QRM free frequency (14,230 kHz) for these historical communications. Each time I personally listened and watched the action, Dick, K6SVP, was doing an outstanding job of describing and transmitting the Voyager views. If there has ever been a group that truly deserved an award for outstanding non-emergency amateur operations, it must be the operators of the Jet Propulsion Labs Amateur Radio Club. Thanks, Gang, for a great activity! A "sampling" of some JPL ARC views are included elsewhere in this column.

SWTPC GOING TV

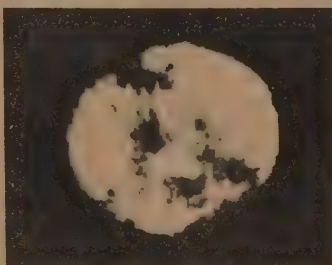
Clay, K6AEP, has been making tremendous progress using his SWTC 6800 computer as a selectable format scan converter. Basically, Clay added a video interface board of his own design to the 6800 to accomplish this feat. The heart of this 16IC interface is a MC6845 C R T controller chip. The complete system has some very interesting capabilities which include Fast Scan zoom of received SSTV pictures, pixel averaging/enhancement, ability to display 128 line SSTV at 256 pixel/lines in Fast Scan mode, operate at any Medium Scan TV rate established, etc. Clay has written a comprehensive article on his setup, so you should be hearing more of this in the near future. Meanwhile, a 'couple of "sneak preview" photos are included in this column.

SEE YOU ON SSTV

That wraps up the column for this time, but we'll be looking for you on the popular SSTV frequencies. 14,230 kHz is the usual fun spot, and Henry, WB9WWM and I are both anxious to see your new pictures! The Thursday evening activities on this frequency are also gaining widespread popularity. Come on in and join the fun! 73, Dave Ingram, K4TWJ, Eastwood Village, #1201 South, Rt. 11 Box 499, Birmingham, Al 35210.



Jupiter's moon Europa from 1.4 million miles away. Another W6VIO "Classic Transmission"!



Voyager II moves closer! Here's Europe from 1 million miles away. W6VIO retransmission: Dick K6SVP operator at that time.



W6VIO - SSTV retransmission of Voyager II's view of Jupiter from 50 million miles away. The multiple layers of Ammonia ice crystals shown produce an unusual effect. Jupiter's red spot, a source of extreme electromagnetic radiation, is in lower right of picture.



A comparison of Jupiter and its youngest moon, Io, is illustrated in the W6VIO SSTV view. That's Jupiter's atmosphere in background and Io in center of picture.

ROBOT SSTV NOW AT YOUR HAM DEALER!



*See him today for your
Free SSTV Demonstration.*

Now you can see what everyone's been talking about, and you can see it all right at your local amateur equipment dealer.

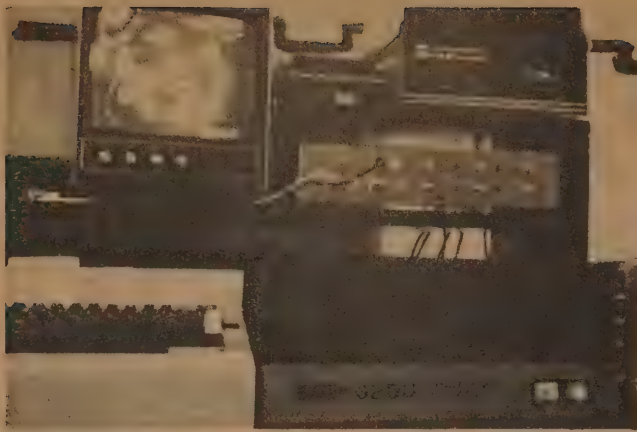
He'll be glad to demonstrate to you how simple it is to install SSTV in your station ... show you the high quality picture you get with the Robot 400, and let you see for yourself all the activity on the SSTV bands.

DEALERS: CALIFORNIA: Henry Radio, Anaheim • Ham Radio Outlet, Anaheim • Henry Radio, Los Angeles • Ham Radio Outlet, Burlingame • Ham Radio Outlet, San Diego • Ham Radio Outlet • Van Nuys • FLORIDA: N & G Distributing, Miami • Amateur Electronic Supply, Orlando • INDIANA: Hoosier Electronics, Terra Haute • MASSACHUSETTS: Tufts Radio, Medford • NEBRASKA: Communications Center, Lincoln • NEW YORK: Barry Electronics, New York City • Harrison Radio, Farmingdale • OHIO: Universal Amateur Radio, Reynoldsburgh • Amateur Electronics Supply, Wickliffe • TEXAS: Madison Electronics, Houston • WISCONSIN: Amateur Electronics Supply, Milwaukee.

ROBOT

ROBOT RESEARCH INC.

7591 Convoy Court
San Diego, Calif. 92111 U.S.A.



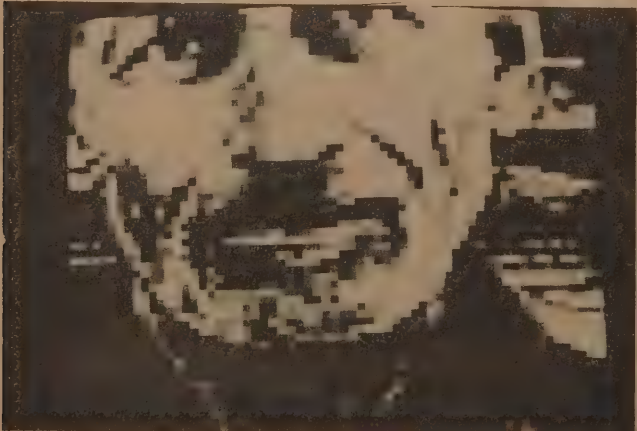
SWTPC 6800 Computer Ssystem with slow/fast scan video interface designed by Clay, K6AEP. Picture on monitor was received by SSTV.



Video interface for K6AEP's 6800 system sitting next to computer 16 IC's are used on this board.



"The Old Man" as displayed on the Monitor of K6AEP's "6800 Video System".



"Special zoom of "The Old Man" is completely under software control. Note gray scale of Pixel formatting.

BUILD A 100 + WATT UHF ATV AMP

ITS CONDUCTION COOLED AND AC POWERED

This amp solves two problems most ATV stations have. First, it will provide more than 100 watts of video output with a modest 10 watts video drive. (My bird shows 120 watts with a video signal) Second, it has a 100 % duty cycle, requiring no blowers no tricky bias circuits (circa solid state amps) and has only 1 input and 1 output tuning adjustment!

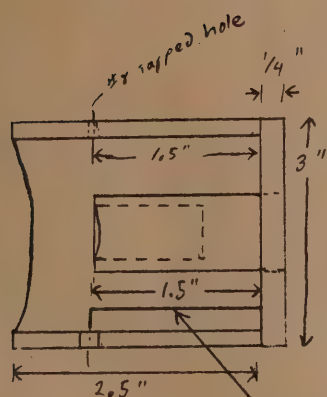
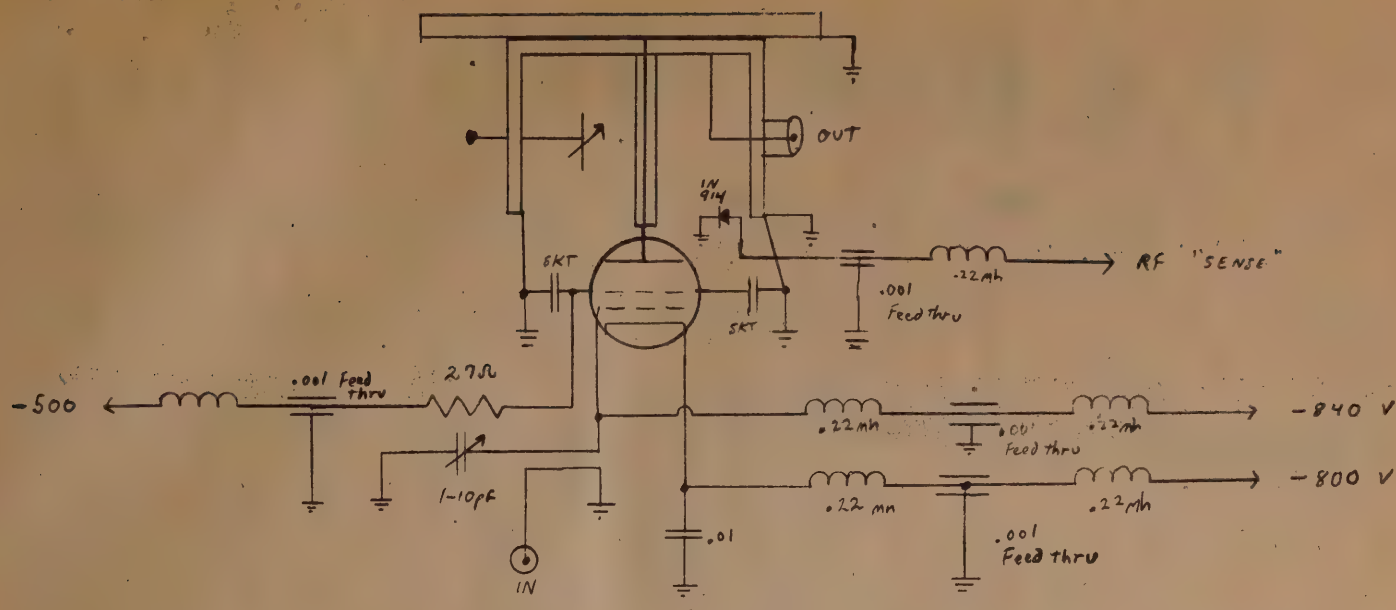
The circuit is very simply, so duplication should be a matter of following the numbers.

The output is a cavity tuned grounded anode 8072 with -800 volts on the cathode. The plate line is a 1" solid brass rod, drilled and cut to force fit over the anode of the tube. This is centered in a brass cylinder with is about 3" OD brass. Output is provided by an untuned line, running parallel to the plate line and terminating in a coax connector. The other end is soldered to the bottom of the cavity. A simple adjustable capacitor is made from a threaded rod, nut and large washer. By simply screwing the washer in and out, it will capacity tune the output. Simply tune for max output!

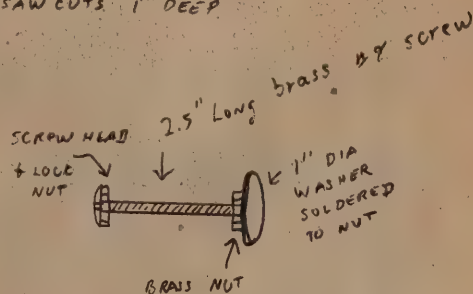
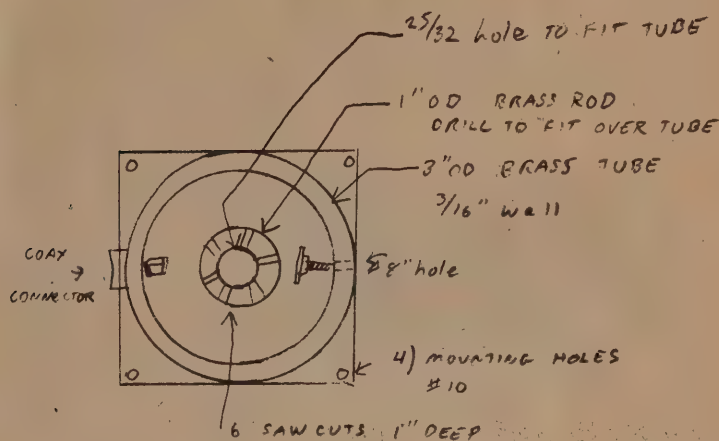
The input is nearly as simple. The input RF is link coupled to the grid in a resonant series LC circuit. A small open air capacitor is used to tune the grid line. All voltages are supplied by a single cast off TV set transformer. Simple RF bypassing is all that is needed on the leads. The tube socket has enough built in capacitance for the screen connection, and the tetrode type tube requires no neutralization.

Mine is built on a standard 5.5" rack panel for easy mounting. Metering could be added for cathode current, or grid bias, but the circuit works so well, that I found that only an output RF indicator was needed for tune up. For this a simple diode detector with an output lead to a 1 MA meter was used to monitor the RF level in the anode area. Simple ground one end as you would in an SWR meter and RF filter the DC output as you like.

Solid brass is used as the tube is conduction cooled. The unit when operating normally will be very warm to the touch. However, I found that despite the high temperatures, there was no damage in prolonged key down (up to 30 hours at a time) at full output. I found that the PC Electronics TC-1 ATV transceiver made a good driver, but any ATV transmitter in the 10 watt output range should do well. Since this is grid driven, you will not want to overdrive the tube. This is clearly evident if you observe the output, as the sync will compress badly with about 15 -18 watts drive. In fooling around with the first one (I built two) I found that 2 watts would provide about 15 out and 4 watts about 40 watts out, and 10 watts about 120 watts out. The signal remains quite linear at all power levels, and it passes sound and color nicely also. I did get better efficiency with silver plated cavity over bare brass.



3/8" WIDE STRIP
SOLDER TO CONNECTOR + BOTTOM
OF CAVITY



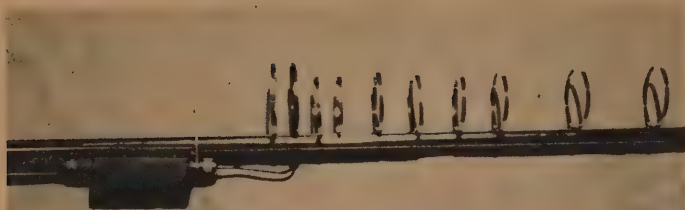
NOTICE

DAYTON

Due to unforeseen circumstances Bob Cooper W5KHT will not be able to attend or set up his demonstration on satellite TV reception. Bob has received special clearance to review classified sites in Micronesia and unfortunately the time when he is able to do this conflicts directly with Dayton. However, Bob Richardson W4UCH who has produced a 200 pg. gunflexer cookbook for Hamm radio magazine has graciously said that he would pitch in for Bob Cooper at Dayton.

P.C. ELECTRONICS

Solid State Fast Scan ATV Modules

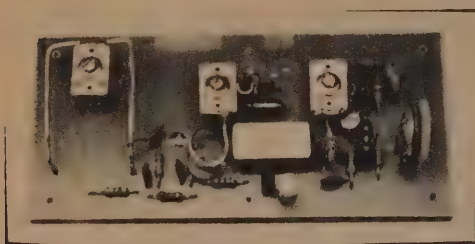


TVC-12.....\$79 ppd
1200 to 1300 mHz CONVERTER
Sensitive varicap tuned
from the shack. Outputs on
channel 7 or 8. requires 12vdc
@ 20 ma and a 10K tuning pot.
Mounts at antenna for low loss.
Enables tuning in multiple

repeaters or working duplex with 400 mHz. Shown attached to the
boom of the Spectrum International 1296-LY loop yagi antenna.

Antenna available thru P. C. Electronics....18 DB over a dipole
measured gain at 1265 mHz....\$56.95 plus shipping

70-MBV-48 420 to 450 mHz 48 element Antenna....15 DB gain mid
band, covers whole band.....\$54.95 plus shipping



TVC-1B.....\$49.50 PPD
420 to 450 mHz CONVERTER
Contains new MRF901 1.7 DB
NF transistor for high sens-
itivity and a double ballanced
mixer for low intermod. Varicap
tuned so it covers simplex and
repeater freq. Can be mounted at
the antenna for low loss.

Outputs to either channel 2 or 3 of your TV set.

*TVC-1C.....\$79.00 ppd ULTRA LOW NOISE CONVERTER
Contains NEC 645 type transistor with a typical NF of .9 DB



ATV TRANSMITTER/CONVERTER — TC-1 \$399.00 ppd
All you need in one box. Contains the TXA5-2, PA5, TVC-1,
FMA5 modules described below in an attractive cabinet with
regulated power supply and solid state T/R relay. Specify
434.0 or 439.25 mHz transmit and TV receiver channel 2 or 3.
Connect to antenna terminals of any TV set, add a good 450
antenna, camera or computer and you are ready to show
the shack, home movies, computer games, etc. 12-14 VDC
and AC version add \$30. On carrier audio ... add \$50.

add \$30 for ultra low noise

MMV1296 Varactor tripler.....\$99.95 plus 2.50 shipping
Puts your 400 mHz 10 watt transmitter out on 1200 mHz video
with about 7 watts. (1240 mHz = 413.33 mHz xmtr output)

ALL YOUR ATV NEEDS FROM P. C. ELECTRONICS 73, Tom W6ORG

Send S.A.S.E. for catalog of ATV Modules and PC Boards.

All orders are check, money order, Master Charge, or BankAmericard.

Charge card orders only by phone 5 to 6 PM your time: (213) 447-4565.

P.C. ELECTRONICS, 2522 PAXSON LANE, ARCADIA, CA 91006

P.C. ELECTRONICS

Solid State Fast Scan ATV REPEATERS

ATVR-4 450 INBAND REPEATER.....\$899

- *Transmit and receive 7pole vestigial sideband filters.
- *FULL bandwidth for color and sound subcarrier.
- *Superimposed video call IDer. Comes on during 1st & 9th min.
- *Keys up on 15750 horizontal sync. No falsing from FM carriers.
- *Video monitor output of transmitted picture.
- *439.25 in and 425.0 out standard.
- *Receiver designed for wide dynamic range. Not a surplus TV.
- *Provision for user special function access by tones on the sound subcarrier. Planned special function include; color bar and pattern generator, Radio Shack TRS-80 interface, weather satellite pictures.
- *Video Clock optional.....\$59

ATVR-12 450 TO 1200 CROSSBAND REPEATER.....\$899

- *Similar to the inband repeater but allows users to see their own video coming back. This is necessary for interaction with computer games, etc. Infact two can play by one on the sound subcarrier and the other on 2 meter FM.
- *439.25 in and 1265 out standard.
- *Use 425 in and 1240 out for trunking or remotes.

The biggest problem with making inband repeaters work in the past was keeping the wideband video from the transmitter out of capturing the receiver. It usually meant sacrificing the color and sound subcarriers and resolution due to sharp cavity filters...or by placing the transmitter at another site. Crossband repeaters do not have this problem as their wide frequency separation is much easier to filter. Now thanks to the 7 pole interdigital filter it is possible to get 5.5 MHz bandwidth and get better than 80 DB rejection 14 MHz away. There is the added benefit of cutting off the lower sideband which gives overall better sound. In many receivers the sound carrier traps are not properly aligned such that DSB video has competing sound subcarriers. This is the case if you have noted that best picture does not coincide with best sound when tuned or excessive sync buzz.

Modules will be available soon for those who wish to build their own.

The output line consists of a 1" OD solid brass rod 1.75" long 1/4" of which fits into the center hole of the base plate used to hold the assembly to a chassis or rack panel. The rod is drilled to accept the anode of the 8072. This requires two concentric holes, one large enough for the main body of the tube, and a smaller one which is drilled about 1/2" deeper to accept the little end cap on the tube. After drilling, three saw cuts are made to provide six slots. By drilling the larger hole 1/32nd of an inch too small, the tube is then force fit to provide positive physical contact necessary for good heat conduction. The rod is sweat soldered to a center hole in the base plate. Additional holes are also drilled in the corners of the base plate for mounting.

The outside of the cavity is made from 3" OD brass tube. A wall thickness of at least 3/16" inch is necessary. The tube is cut 2.5" long. 1.5" from the base end of the tube, you will drill two holes. Be sure the base is square and flat, and the tube end is also square and flat. File or mill the ends to close tolerance. When done right; the cylinder will be RF tight. The two holes will be directly opposite each other at the 1.5" mark from the base end. Drill one and tap it to hold the # 8 screw, which is used to hold the 1" washer for a plate tuning capacitor. The other hole is drilled to accept your output RF connector. You may want to file a flat area the size of the base of your connector if you use type N or UHF, BNC is small enough and does not require additional screws for mounting. If you use a BNC for output, drill and tap the hole so the BNC screws directly into the wall of the brass tube. Avoid any additional nuts on the inside of the cavity. If you use a flange mounted connector, drill the four holes for mounting and tap them to accept the size screw you will use, again so no nuts are inside the cavity. The output line is a piece of silver plated brass shim stock cut to 3/8" width. One end is bent 90° to allow the ends to be soldered, one to the "floor of the cavity, half way between the center rod and outer wall, the other end is soldered to the output connector.

The screw is inserted in its hole, then the washer/nut is attached inside the cavity. The outside of the cavity is sweat soldered to the base. Because of the mass of metal, a small butane torch is needed.

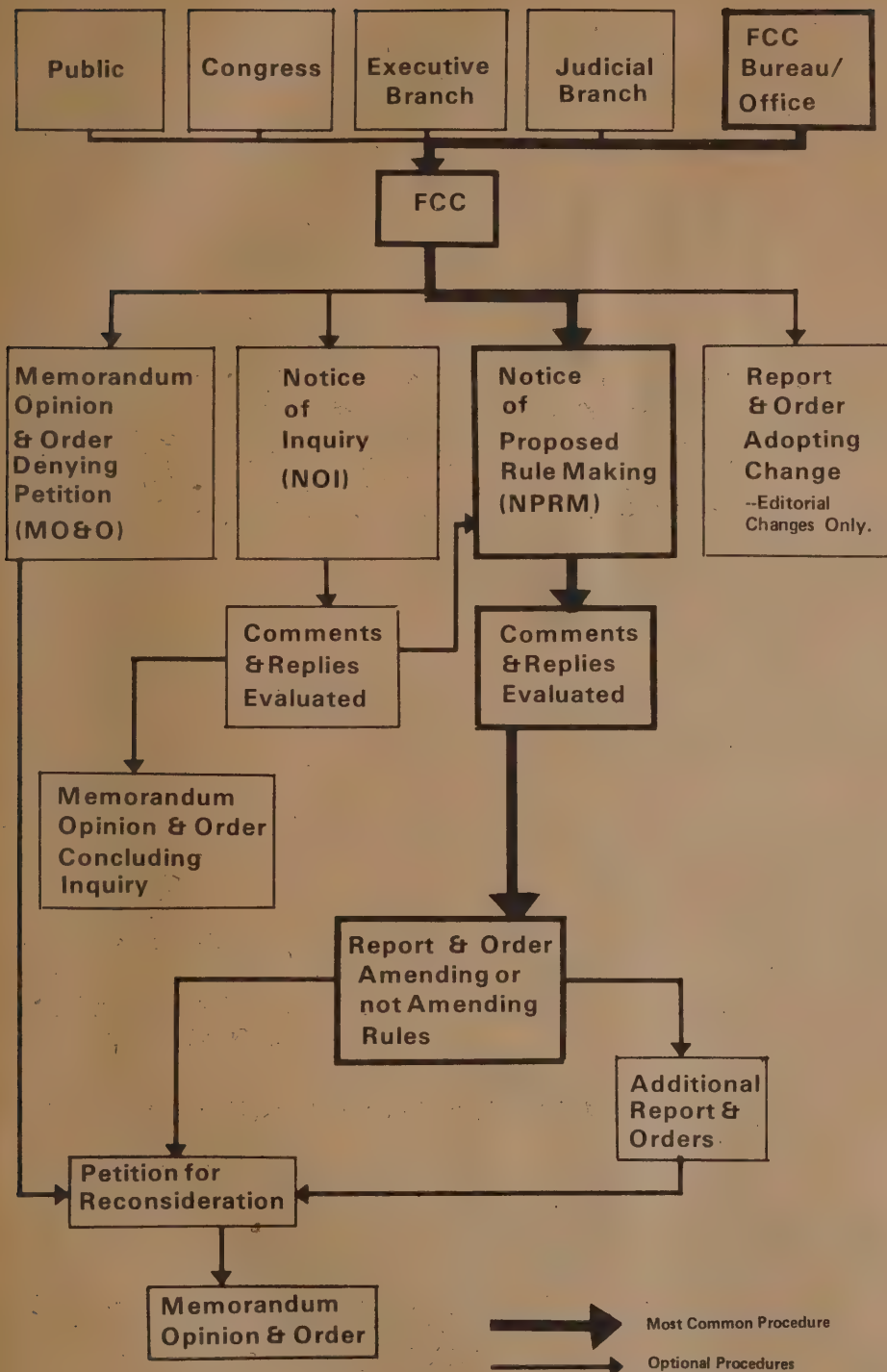
The input circuit is built in a small Bud Box, 4 X 5 inches and 4" deep. Mount the tube socket so there is 1" space between the right hand wall of the box and the outer edge of the socket. The input tuning capacitor is mounted 3/4" away from the input BNC connector, center to center. Another piece of 3/8" wide brass stock is used to connect the input tuning cap to the grid connections of the tube. There are three active pins for the grid on the tube. Heavy buss wire or flat stock is used to connect the grid pins 3 and 8 to pin 11. The input line connects to pin 11 and the fixed plates of the cap. The variable plates are at ground. The RF input goes to ground through a 3/8" wide line running parallel to the grid line. The input line is soldered to the box or bottom of the socket as shown.

A small partition is added to the box opposite the input. The partition is soldered to the two vertical walls and bottom of the box. A line of holes is drilled in the partition to accept the feed through caps (6) used to feed the DC voltages to the tube. RF chokes and the 27 ohm resistor run directly from the feedthrough caps to the tube pins. Pins 1, 4, and 9 are soldered to the capacitor which is integral with the socket, as part of the screen connections.

The RF sense diode is attached to the outside of the box which will be inside the cavity. The other lead is brought into the input side of the box with a feed through cap.

When completed, the input box is fastened to the cavity with 6 or 8 screws. Hold the box in place by mounting the tube and inserting the tube into the central rod of the cavity. The box should be flush with the end of the cavity. Orient the input to provide access to input/output connectors and adjustments. I found it easier to have the input on the opposite side of the output to place the two adjustments on the same side of the finished cavity, but orientation is not important. Once you choose the position, mark with a center punch 6 or 8 holes. Drill and tap the cavity end to accept a #4 screw, and complete assembly.

How FCC Rules Are Made



Steps:

I. Initiation of Action. Suggestions for changes to the FCC Rules and Regulations can come from sources outside of the Commission either by formal petition, legislation, court decision, or informal suggestion. In addition, a Bureau/Office within the FCC can initiate a Rule Making proceeding on its own.

2. Bureau/Office Evaluation. When a petition for Rule Making is received, it is sent to the appropriate Bureau(s)/Office(s) for evaluation. If a Bureau/Office decides a particular petition is meritorious, it can request that Dockets assign a Rule Making (RM) number to the petition. A similar request is made when a Bureau/Office decides to initiate a Rule Making procedure on its own. A weekly notice is issued listing all accepted petitions for Rule Making; the public has 30 days to submit comments. The Bureau/Office then has the option of generating an agenda item requesting one of four actions by the Commission. If an NOI or NPRM is issued, a Docket is instituted, and a Docket number is assigned.

3. Possible Commission Actions. Major changes to the Rules are presented to the public as either an NOI or NPRM. The Commission will issue an NOI when it is simply asking for information on a broad subject, or trying to generate ideas on a given topic; an NPRM is issued when there is a specific change to the Rules being proposed. If an NOI is issued, it must be followed by either an NPRM or an MO&O concluding the inquiry.

4. Comments & Replies Evaluated. When an NOI or NPRM has been issued, the public is given the opportunity to comment initially, and then respond to the comments that are made. When the Commission does not receive sufficient comments to make a decision, a further NOI or NPRM may be issued, again calling for comments & replies. It may be determined that an oral argument before the Commission is needed to provide an opportunity for the public to testify before the Commission, as well as for the Bureau(s)/Office(s) to present diverse opinions concerning the proposed Rule change.

5. Report & Order Issued. A Report & Order is issued by the Commission stating the new or amended Rule, or stating that the Rules will not be changed. The proceeding may be terminated in whole or in part.

6. Additional Report & Orders Issued. The Commission may issue additional Report & Orders in the docket.

7. Reconsideration Given. Petitions for reconsideration may be filed by the public within 30 days; they are reviewed by the appropriate Bureau(s)/Office(s) and/or by the Commission.

8. Modifications Possible. As a result of its review of a petition for reconsideration, the Commission may issue a MO&O modifying its initial decision or denying the petition for reconsideration.

This brief account of how Rules are made at the FCC merely highlights the major components of the process. For details, contact the Dockets Branch.

Reprinted from the FCC Communicator, September, 1975.

How To File Comments In An FCC Rulemaking

The following guidelines are provided to assist you in filing comments with the FCC:

YOUR EXPERIENCE

The FCC is interested in any experiences, judgments or insights you might have that would shed light on issues and questions raised in an inquiry or rulemaking.

FACTS

Your comments should explain who you are and what your interest is. State the facts briefly, but fully. Clearly explain your experience and any additional evidence which supports your position.

BE SPECIFIC

Your comments should be explicit. If the details of the proposed rule or if only one of several provisions of the rule are objectionable to you, make this clear. If the rule would be acceptable with certain safeguards, explain them and why they are needed.

OTHER OPINIONS

Your comments should include facts which might support a different position, discuss them and explain why the public interest requires that the matter be resolved as you propose.

FILING DATE

Arrange for your comments to reach the Commission on or before the comment or reply comment date included in the Notice of Inquiry or Notice of Proposed Rulemaking.

FILING COMMENTS

Submit your written comments to: Secretary, Federal Communications Commission, 1919 M St., N.W., Washington, D.C. 20554.

If you want your comments to be received as a formal filing, you must submit an original and five copies; however, you may simply submit one copy to be filed in the Docket as an informal comment.

DOCKET NUMBER

Be sure to note the Docket Number or Rulemaking Number on your comments.

PUBLIC DOCUMENTS

You can obtain copies of a Notice of Inquiry or a Notice of Proposed Rulemaking by contacting the Public Information Officer, FCC, 1919 M St., N.W., Washington, D.C. 20554. (202) 632-7260.

All Notices of Inquiry and Proposed Rulemaking are printed in the Federal Register soon after they are released by the Commission. The Federal Register is available in most public libraries across the country.

THE CPRA ATV RPT SYSTEM WR3ABV

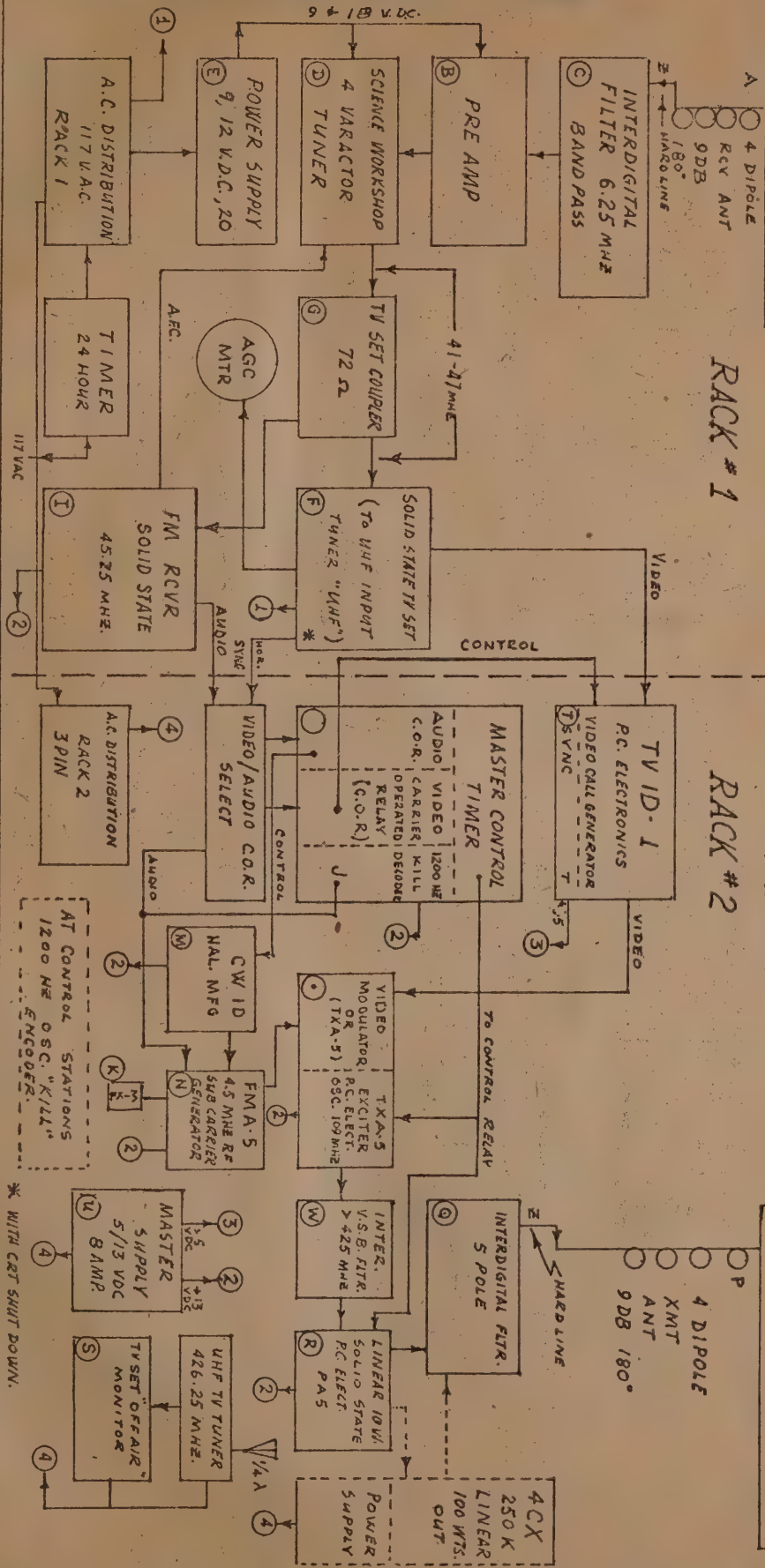
INPUT: 442.5 MHz
SOUND ON CARRIER

RACK #1

RACK #2

VERTICAL POLARIZATION

OUTPUT: 426.25 MHz VIDEO
430.75 MHz AUDIO



PLANNED/DESIGNED by W3HMS John

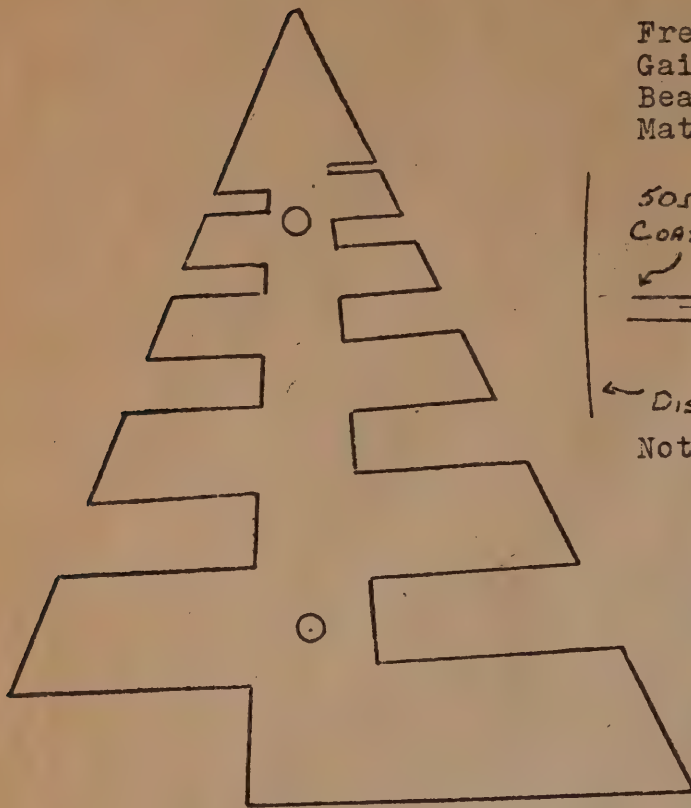
CPRA ATV REPEATER WR3ABV 18 AUG 78

DRAWING by W3HAN Bob

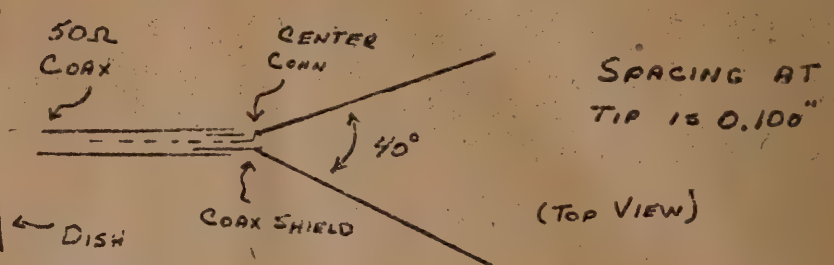
BUILD A 2300 MHZ RECEIVE CONVERTER

LOG PERIODIC ANTENNA

by Don Lain W B9SFE



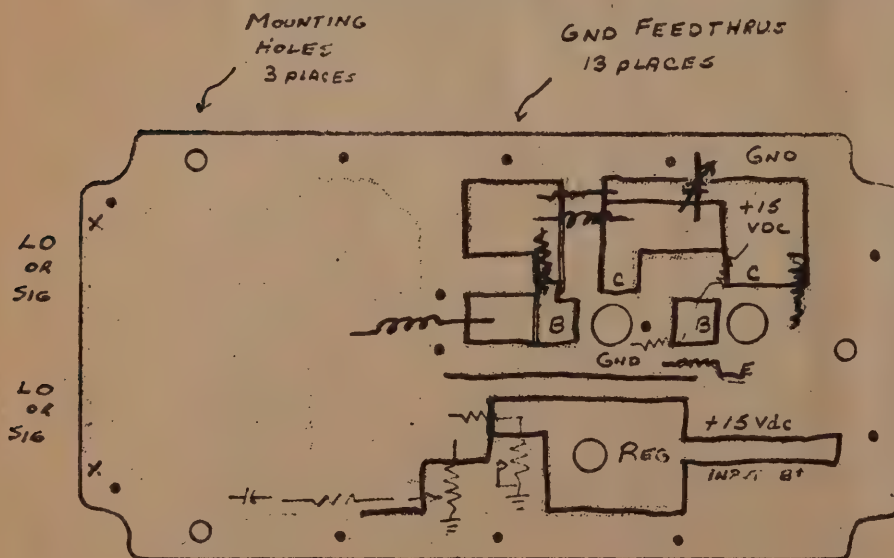
Frequency $\approx 1.5 - 4.0$ GHz
 Gain ≈ 7 dB
 Beamwidth ≈ 55 degrees
 Material Copper, brass or Cu Clad



Notes:

1. Each side is mirror image when assembled.
2. Mounting material should be plastic, nylon or any non-conductor.
3. For "Mirror" 25" snow sled max gain occurs when tip of log periodic is 9.5" from center of dish (sled).
4. Polarized gain of snow sled with log periodic feed @ 2150 MHz is 18.5 - 20 dB. Beamwidth is 10° .
5. For vertical polarization, elements should be pointed up and down.
6. Short metal screws may be used to mount metal antenna to supports.

BIASED MICROWAVE MIXER, IF AMP, LINEDRIVER & REGULATOR PC BOARD



Material- $1/32"$ (0.031") double sided Cu clad board $\epsilon_r \approx 2.55$

Package - Bud CU-124 Econobox (Approx \$3.00)

Light areas are copper

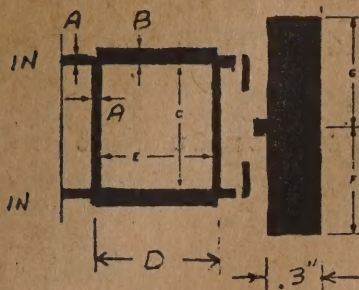
Transistors are inverted and mounted through the PC board.

Input connectors are panel mount SMA from E F Johnson (Approx \$3.50 each)

BIAS FOR DIODES GND LUGS ADDED TO SMA CONNECTORS & SOLDERED TO PC BOARD AT POINT X (2 PLACES)

Quadrature-hybrid microwave mixer is discussed in detail in October 1975 article in HAM RADIO. This mixer is scaled from 2304 MHz to 2150 MHz with additional grounding.

QUADRATURE-HYBRID MICROWAVE MIXER DATA

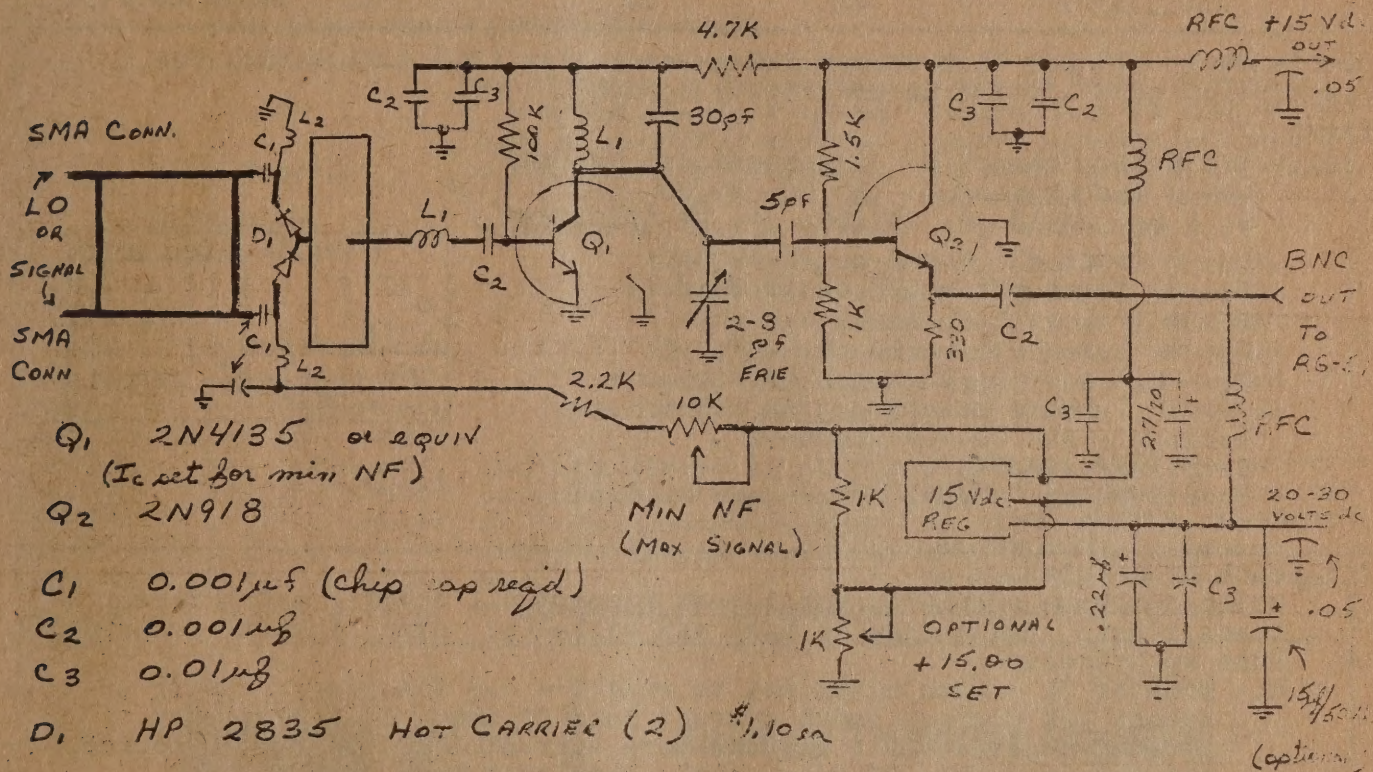


Signal @ 2150 - 2156 MHz
LO @ 2210 MHz or 2216 MHz
Material - 0.031" Cu Clad board

Dimensions:

A	0.053"
B	0.096"
C	0.643"
D	0.643"
E	0.590"
F	0.653"
G	0.633"

Note: Hold all tolerances to $\pm 0.005"$ if possible
Using 1/16" Cu Clad requires doubling dimensions A and B.



Q1 2N4135 or equiv

(Ic set for min NF)

Q2 2N918

C1 0.001 μ F (chip or regid)

C2 0.001 μ F

C3 0.01 μ F

D1 HP 2835 Hot Carrier (2) \$1.10 ea

L1 10T #26 over 10-32 BOLT (2)

L2 1 or 2T #28 (1/4w resistor lead) over #50 or smaller drill

RFC #26 over 1/2w resistor

Regulator +15 Vdc (RADIO SHACK) \$1.29

CHARACTERISTICS

NF ≤ 7.0 dB 6.0 dB Typ.

BW ≈ 8 MHz @ 60 MHz

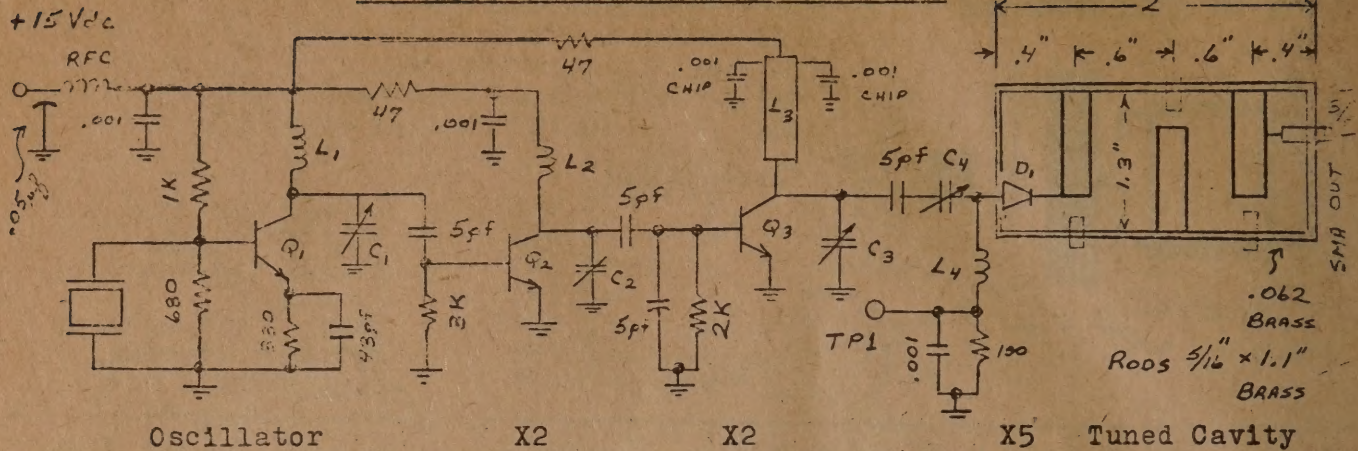
Power +20-30 Vdc @ 25-30 ma

GAIN ≈ 18 dB (6dB mixer loss + 24dB IF gain)

NOTES:

1. FILTERED dc on COAX
2. Q1 may be replaced with 2N918 with 1dB increase in NF

LOCAL OSCILLATOR BUILD INFORMATION

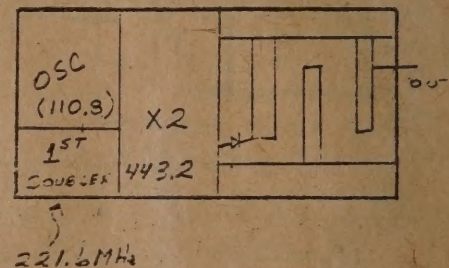


See January 1974 QST "Interdigital Converters for 1296 & 2304 MHz" for discription of a similar LO and cavity design.

Parts:

XTAL 110.5 MHz Channel 2 International Crystal
 110.8 MHz Channel 3 HC 18 \$9.00
 Q1 & Q2 2N918 Q3 2N3866 D1 HP 5082-2835
 L1 6 turns #26 wound on 10-32 bolt
 L2 2½ turns #26 wound on 10-32 bolt
 L3 0.3" x 1.5" Cu strip
 L4 10 turns #30 wound on 2-56 bolt
 C1 - C4 1 - 10 pF piston cap (glass)
 (Erie rotary may be substituted)
 Package - BUD CU-124 Econobox -
 Coupling capacitors - MICA if possible
 Construction - 0.062" Brass and Cu Clad

LAYOUT



Alignment Procedure:

1. Build to above schematic and layout keeping all emitter and bypass leads short. Inductance in base and collector ckt is part of tuned ckt
2. Tune up procedure:
 - a. Monitor TP 1 with a VOM set to read 0 - 1.5 Vdc (Neg). Using a second VOM monitor input current into LO ckt. In general the greater negative TP 1 and the more current from the +15Vdc source, the more possible RF power out. Note that both doublers are Class C amplifiers with no DC bias except input RF drive.
 - b. If both TP 1 and input current are low (ie, less than -1.5 Vdc and 80 ma) after initial alignment of C1 through C4, increase coupling between oscillator and 1st doubler (change 5 pF to 10pF). Coupling between both doublers may also be increased. Remember the object is to obtain 4 - 5 mw output with maximum circuit Q. Increasing the coupling decreases the overall circuit Q.
 - c. If input current is greater than 80 ma but TP 1 is less than -1.5Vdc check output ckt of Q3 and chip bypass capacitors on L3
 - d. Once -1.5Vdc or greater is obtained at TP 1, tune all three brass 10-32 screws for maximum power out using received signal or external test equipment. The length of the rods may be varied by sliding rod through brass wall and resoldering. When lid is placed on BUD box the output ckt of Q3 and brass screws will require slight realignment.
 - e. On my two LO's power out of 4mw corresponded to 72 ma with TP 1 reading a -2.7 Vdc.

World's Most Complete Fast Scan Book ATV IN A NUTSHELL

This 72 page book has information, theory and build it projects for a complete station. Over 120 diagrams adorn its 8 x 11 pages. Everything you need to know to build and operate your own HAM TV station. All projects are solid state. No old tube circuit! Many extras! Only \$5 each plus 50¢ 4th class or \$1.25 first class mail. Buddy pack, 2 copies for \$10 post paid!

ORDER FORM

Please send _____ copies of ATV in a Nutshell
free camera alignment chart with each copy.

SLOW SCAN TELEVISION AWARDS

Amateur Television Magazine is now offering a series of award certificates for SSTV activity ranging from a basic award through several levels of difficulty to a Master Scanner award. The beginning level certificate requires the SSTV operator to have confirmed five SSTV contacts on each of any five ham bands, a total of 25 contacts. The bands used for all the levels may be

any combination of the contestants
In addition to the normal frequency bands, the use of QSCAR may be used as 2 bands for any two OSCAR modes. i.e., 5 contacts via 450/144 oscar would count as 1 band for the basic

suitable for framing. Numbered consecutively, each will attest to the operators proficiency. ATV Magazine will publish the names and calls of each certificate holder as issued.

The award levels are:

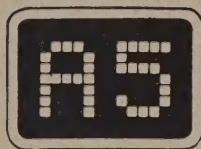
5 SSTV QSO's	on each of any 5 bands,	25 contacts
6 SSTV QSO's	on each of any 6 bands,	36 contacts
7 SSTV QSO's	on each of any 7 bands,	49 contacts
8 SSTV QSO's	on each of any 8 bands,	64 contacts
9 SSTV QSO's	on each of any 9 bands,	81 contacts
10 SSTV QSO's	on each of any 10 bands,	100 contacts

certificate.

choosing. Additional awards are available for working increasing numbers of stations on increasing numbers of bands.

Each certificate is 8 x 11 inches and

Applicants should send proof on QSO and \$1 for postage for each award to: SSTV MASTER SCANNERS AWARDS, PO Box 1347 Bloomington, IN 47401. Allow two weeks for processing and award preparation.



Amateur Television Magazine

DEVOTED TO HAM TV

P. O. Box 1347 Bloomington, Indiana 47402

YES! SIGN ME UP FOR . . .

U.S. and Canada:

Elsewhere:

[]	1 year	(six issues)	\$ 6.50	\$ 9.00	NEW!	[]
[]	2 years	(12 issues)	\$11.50	\$17.00		
[]	3 years	(18 issues)	\$16.50	\$25.00	RENEWAL	[]

of informative, interesting A-5 MAGAZINE . . . my money is enclosed!

NAME _____ CALL _____

STREET _____

CITY _____ STATE _____ ZIP _____

START WITH THE _____ ISSUE.

Be a PIONEER in HAM TV

... build your own camera!

Improved kit makes assembly easier and more fun than ever!



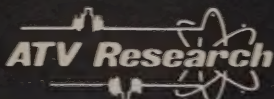
Ideal for A5 amateurs, experimenters, industry, education, etc. * Solid-state * Complete with high sensitivity INDUSTRIAL grade 7735A vidicon * Completely self-contained with power supply * RF and VIDEO outputs * Fully guaranteed.

The ATV Research Model XT-1A, Series D is the only known TV camera available both in kit form and factory assembled. Complete kit only \$185.00. Factory-assembled \$265.00. Postpaid delivery throughout the USA, Canada and Mexico.

OTHER KITS and PARTS: Audio subcarrier kit model ASC-71, \$28.95; Direct-drive focus-deflection coil kits, transistor type \$24.95, tube type \$19.95; USA vidicons (7735A) four grades from \$19.95 to \$49.95; Many accessory lenses including normal, telephoto and wide angle; standard and focusing lens mounts; plans, charts and many other items also available.

PHONE or WRITE for FREE illustrated color catalog. DIAL 402-987-3771

130 N. BROADWAY



DAKOTA CITY, NEBR. 68731

AMATEUR TELEVISION MAGAZINE, 7391 W. ST. HWY 46, ELLETTSVILLE, IN 47429
SECOND CLASS POSTAGE PAID, BLOOMINGTON, IN, 47401 AND ELSEWHERE

A5 Magazine
P.O. Box 1347
Bloomington, Ind. 47401